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INDUSTRIAL EDUCATION

REPORT
OF

COMMITTEE ON INDUSTRIAL EDUCATION

OF THE

AMERICAN FEDERATION OF LABOR

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Compiled and edited by
CHARLES H. WINSLOW



PRESENTED BY MR. PAGE
AUGUST 17, 1912.—Ordered to be printed



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CONTENTS.

	Page.
Foreword.....	5
Appointment of committee.....	6
Scope of the resolution.....	6
Members of the committee.....	6
The problem.....	7
Classification and definitions.....	8
Point of view and recommendations of the committee.....	10
Point of view.....	11
Recommendations.....	18
Conclusions.....	18
Progressive attitude of the American Federation of Labor toward vocational education.....	21
Trade union schools.....	25
Digest of United States Bureau of Labor report on industrial education.....	33
Public trade schools.....	34
Cooperative schools.....	50
Apprenticeship schools.....	57
Massachusetts "independent industrial schools".....	59
New York State system.....	66
Philanthropic schools.....	74
Industrial education for girls.....	90
Industrial education for negroes.....	93
Vocational guidance.....	98
State commission on industrial education.....	104
Appendices:	
(a) President Gompers's report to the Toronto convention.....	104
(b) Executive council's report to the Toronto convention	106
(c) Preliminary report of committee on industrial education to the Toronto convention.....	108

INDUSTRIAL EDUCATION.

FOREWORD.

Of the great educational work which the American Federation of Labor has done during the past quarter of a century the public in general has no conception. Mere statistics are wholly inadequate to convey the value of what has been accomplished.

The committee on industrial education, appointed in accordance with a resolution adopted at the Denver convention of 1908, entered upon its duties with the most profound regard for the work intrusted to it. The committee have constantly kept in mind their great responsibility, and it is with the feeling of much anxiety that they present for approval their report upon a question so inadequately developed, involving as it does the whole range of social and economic relations of our citizenship.

While great progress has been made in the introduction of industrial education in the last decade, much of which, however, can only be considered of an experimental nature, it is confidently expected that the next decade will witness further great developments in the application of a sound system of education. The line of progressive industrial education must be constructive. Any system to be of value must also necessarily be one of growth. The adoption of a scheme of education must train up a far more capable and comprehensive body of citizens by emphasizing their position in society as producers, consumers, and as men. A general educational policy which will greatly ease the strain of demoralization which so sadly affects the children of the poor ought, by giving vocational training alongside of cultural training, advance them more at the age of 16 than now obtains at 18.

Assuming, then, that the social stratification in America is vertical, the problem is to find the highest elevation which any youth's ability will permit him to reach and to get him to that elevation.

Apropos of this problem, the size of which is the length and breadth of America, and because of the interdependence of industrial effort, the American Federation of Labor's committee on industrial education have undertaken a comprehensive study helpful toward its solution. The progress made and reports issued have already had a salutary effect upon educators, employers, the press, and the public in general. Economic considerations plead for the creation and multiplication of opportunities for industrial and technical education, and to the attainment of those laudable purposes this report is dedicated.

APPOINTMENT OF COMMITTEE ON INDUSTRIAL EDUCATION.

In accordance with a resolution adopted by the Denver convention of 1908 a special committee on industrial education was appointed to investigate and report on the subject matter to the Toronto convention. In compliance with the resolution, the committee made a preliminary report, but later, by authority of the Toronto convention, the life of the committee was extended so that it might further pursue its studies in the light of a searching investigation, which was being carried on by the United States Bureau of Labor.

The investigation and report made by the United States Bureau of Labor was undertaken at the request of the American Federation of Labor's committee on industrial education, and it is believed to be the most comprehensive inquiry ever made on the subject in the United States.

Text of the resolution creating the special committee on industrial education:

The president, in conjunction with the executive council of the American Federation of Labor, be, and is hereby, authorized to appoint a special committee of at least 15, to be composed of the majority of trade-union members of this convention, who will serve without compensation and incur no expenses other than the necessary and legitimate expenditure within the judgment of the president and the executive council, to investigate the methods and means of industrial education in this country and abroad, and to report its findings, conclusions, and recommendations to the next annual meeting of the American Federation of Labor.

SCOPE OF THE RESOLUTION.

From the terms of the resolution under which the committee was constituted it is evident that what was desired was:

1. A thorough investigation of the needs of industrial education.
2. A statement of the extent to which the needs are now met by existing institutions.
3. As the result of such investigations, some definite suggestions for the promotion of industrial education in such a manner as might best serve the interests of the whole people.

MEMBERS OF COMMITTEE.

In accordance with the provisions of the resolution there were appointed as members of the committee the following:

- John Mitchell, chairman, New York City.
Mrs. Raymond Robins, president National Women's Trade Union League, Chicago, Ill.
Miss Agnes Nestor, secretary Glove Workers' International Union, Chicago, Ill.
Dr. Charles P. Neill, United States Commissioner of Labor, Washington, D. C.
Congressman William B. Wilson, Washington, D. C.
Rev. Charles Stelzle, department of church and labor, New York City.
Charles H. Winslow, member Massachusetts Commission on Industrial Education, Boston, Mass.
Edward Hirsch, editor The Labor Leader, Baltimore, Md.
John Golden, president United Textile Workers, Fall River, Mass.
James Wilson, president Pattern Makers' League, Cincinnati, Ohio.
Frank Duffy, secretary Brotherhood of Carpenters, Indianapolis, Ind.
James O'Connell, president International Association of Machinists, Washington, D. C.
John B. Lennon, treasurer American Federation of Labor, Bloomington, Ill.
Hugh Frayne, general organizer American Federation of Labor, New York City.

James Roach, general organizer American Federation of Labor, Albany, N. Y.
Stuart Reid, general organizer American Federation of Labor, Lynn, Mass.

By unanimous vote at its first meeting, the following were elected to serve as members of the committee:

Samuel Gompers, president American Federation of Labor, Washington, D. C.
Frank Morrison, secretary American Federation of Labor, Washington, D. C.
James Duncan, first vice president American Federation of Labor, Quincy, Mass.
D. A. Hayes, fourth vice president American Federation of Labor, Philadelphia, Pa.
William D. Huber, fifth vice president, American Federation of Labor, Indianapolis, Ind.
Joseph F. Valentine, sixth vice president American Federation of Labor, Cincinnati, Ohio.
John R. Alpine, seventh vice president American Federation of Labor, Chicago, Ill.
H. B. Perham, eighth vice president, American Federation of Labor, St. Louis, Mo.

THE PROBLEM.

The problem of industrial education and trade training is made extremely complex by the present system of specialization, and unless great care is exercised the exploitation of boys who desire to enter upon a career as a skilled craftsman is probable.

A proper apprenticeship system which will guarantee to the youth the opportunity of learning his trade as a whole is very much desired.

One of the disadvantages of many apprenticeship systems is that establishments have become so large and with so many departments with their divisions and subdivisions and processes that the time of the boy is fully employed in mastering details of one department to the exclusion of all other departments. Public industrial schools or schools for trade training should never become so narrow in their scope as to prevent an all around shop training.

The progressive development of all high-grade industries requires skilled workmen, possessing "industrial intelligence"—that is, comprehensive insight into and intelligent interest in their several trades—as well as skill. The present conditions of production are usually unfavorable to the training of such workmen in the shop or factory, and sometimes render such training impossible. All industries, whatever their grade, need more men than are now obtainable, who are capable of acting as foremen, superintendents or managers—men possessing the comprehensive insight, interest, and skill necessary for the organization and direction of a department or a shop. In general, such men, whether workers, foremen, or superintendents, are now developed only by chance, and they are then self-made men, possessing the merits but also the shortcomings of their training.

Meanwhile boys are not only not directed toward the trades in our existing schools, but are actually often directed away from them by the bookish education of those schools and their purely academic traditions. The public schools are doing their work to-day better than they have ever done it. This statement is made on evidence, and is not merely an opinion. But, both on account of the youth of the children up to the end of the grammar school period and because of the general education which those schools exist to supply, it is only natural that they should not have concerned themselves with the development of a vocational purpose, nor with the training which points toward the realization of that purpose. Up to the age of 14 the whole of a pupil's time is required for the general education on which his vocational training should be based.

The high-school pupils have entered a longer career of general education, and in most cases look forward to a business career or to further study in some higher institution for a profession. The academic high schools, accordingly, even when they comprise so-called commercial courses or courses in manual training are not vocational schools; they are schools for general education, and, like the elementary schools, are doing their work better than they have ever done it. They do not, however, aim to supply the specific education required for a particular calling.

In every democratic society the schools provided the public should meet the needs of all classes—those who are not going to college as well as those who are. The existing public high schools serve to give a general education to those pupils whose training must cease on graduation, and at the same time they offer preparation for admission to college or some higher technical school. The manual-training high schools—or so-called technical high schools—were intended originally to train recruits for the trades, but they have not done so. They are institutions for general education, like the academic high schools, but, unlike them, serve to give a certain class of pupils a general high-school education with the help of manual training, or, like them, to prepare their pupils for higher training in some college or engineering school.

Boys are not wanted in most of the skilled industries until they are 16 years of age. The total result is a great number of boys and girls from 14 to 16 years of age, most of whom are at work in various kinds of juvenile occupations in which they learn no trade, are subject to little if any beneficial general education, and often to much harmful education from shifting experience and environment. Large numbers of these children would be in school if the school promised preparation for some life pursuit. These years are of little economic value to such children, and there is little increase in the economic value of most of them as time goes on. Hence, these are at present wasted years—lost to the children because of a lack of economic growth, and to the industries because children are not fitted to satisfy the demand for trained workers by the time they are old enough to be employed in the trades.

These years and subsequent years are, however, valuable for industrial education; but the present school systems are wholly inadequate.

Hence the need of industrial schools to supplement the existing school system and to meet a new educational need which has developed with the evolution of our industries and commerce.

CLASSIFICATION AND DEFINITIONS.

In any discussion of the present status or future development of industrial education it is perfectly obvious that there should be a common understanding as to what the subject implies, and that the terminology of vocational education be well defined.

The terms, "manual training," "manual arts," "mechanic arts," "technical high," "industrial," "trade," and "vocational" schools are used by many educators and writers indiscriminately.

It is believed that industrial education has developed to the point where a definite terminology should be established, and where a segregation of the various kinds of schools mentioned should be uni-

versally recognized. Within the schools embraced by the above terms, virtually the whole gamut is run, beginning with the mere smattering of manual training which some schools give, on through the manual training school, through the technical high school which aims to prepare pupils for higher technical instruction.

Beyond, and distinctly separate from these, are found the strictly and purely "industrial," "trade," "preapprenticeship," and "apprenticeship" schools. These latter should be defined as preparing pupils to enter a manual vocation, be it described as trade or vocation. These schools thus distinctly differ from the aforementioned schools and are the ones to which attention is now being given.

Manual training, manual arts, and technical education as supplied by many schools are culturalized to such an extent that they fail to prepare pupils to enter the manual vocations. This perhaps can be traced largely to the fact that these manual exercises have been taught by professional teachers and not by practical trade instructors experienced in and with the processes and practice of the trades. A distinct line of demarcation separating those schools which culturalize manual and vocational work from those which aim to prepare pupils to enter the manual vocations should be established. If this be done, it will result in a classification that will inevitably tend to the lasting benefit of schools aiming to prepare pupils for the manual vocations.

TERMINOLOGY.

The lack of strict terminology has been heretofore a confusing and even retarding factor in the introduction and establishment of industrial education, but it is now generally conceded that the following definitions are applicable:

Manual training.—Manual training had its beginning 30 years ago in secondary schools with four distinct avowed objects in view: (1) To educate the whole boy, to develop the entire area of his brain; (2) to lay a broad and appropriate foundation for higher education; (3) to enable a boy to discover his innate mental and physical aptitudes; (4) to furnish a broad basis for an industrial career should one's aptitude lie in the direction of the mechanical arts. It admitted only boys of 14 years or more, who had finished the grammar grades—the average age was about 15.¹

Technical high schools.—Technical high schools are schools giving training in practical industrial processes or instruction in the scientific and mathematical principles upon which these processes are based, whose purpose is not to prepare pupils for the trades, but rather for entrance to higher scientific schools.

Vocational schools.—This term in one sense is a broad one and includes commercial, technical, agricultural, and professional schools, as well as industrial schools.

In its use as applied to a phase of industrial education, however, a vocational school is one which (a) prepares for a manual occupation which is not classed as a trade, or (b) gives training in some line of manual work for the purpose of directing the pupil toward, rather than in immediate preparation for a trade or other manual occupation.

¹ The Logic and Method of Industrial Education, p. 7: Calvin M. Woodward.

Industrial education.—This term is a general one and denotes the field of education designed to meet the needs of the manual worker in the trades and industries, including the work of schools that aim to prepare pupils for entrance into the manual vocations, either as learners, apprentices, or journeymen, or to give supplemental instruction to those already in a trade or other manual vocation.

Trade preparatory schools.—Trade preparatory schools are schools that teach the elements of trades (including practice and some theory) and prepare a pupil to enter a trade school, an apprenticeship, or to become a learner in a trade.

Apprenticeship schools.—Apprenticeship schools are those conducted by employing establishments for the instruction of their apprentices in the processes and practices as well as the related drawing, mathematics, etc., of their respective trades. Occasionally such a school is operated outside of the establishments by other agencies for the employing establishments.

Trade schools.—Trade schools are schools that teach trades in their entirety, i. e., the processes and practices as well as the scientific and mathematical principles upon which these processes are based, and take the place of an apprenticeship.

Part-time schools.—Part-time schools are operated primarily for apprentices, the establishment usually requiring them to give a stated number of hours per week in attendance at a school not under the control of the establishment.

Cooperative schools.—Cooperative schools are operated for the instructions of apprentices and other employes under a cooperative agreement between the school and the employing establishments. They may be, and are, conducted in connection with public, private, and philanthropic efforts.

Continuation schools.—Continuation schools are schools conducted (mostly in the evening) to give instruction in trades or vocations to those already employed in such trades or vocations. The instruction consists of either supplemental practice in the trades, related subjects of study, or both.

Prevocational schools.—Prevocational schools are schools operated primarily to give boys and girls between the age of twelve and fourteen, during part of each day, some intensive work in manual training, in an effort to discover their natural bent for vocational education.

POINT OF VIEW AND RECOMMENDATIONS OF THE COMMITTEE.

The committee entered upon its duties without fixed notions as to the form industrial education should take throughout the country, and, in consequence, its inquiries and studies have made the most profound impression upon its members.

Keeping in mind the scope of the resolution, as well as the complexity of the situation, the committee addressed themselves to the following questions, in an effort to bring out practical suggestions toward the solution of the problem:

1. Should trade, vocational, technical, and industrial schools be established as a part of the public-school system?
2. Should private industrial educational institutions be tolerated?

3. Under what conditions and terms should industrial schools, either public or private, be countenanced and supported?

4. Under what conditions should the semiprivate or semipublic industrial schools—namely, the so-called cooperative industrial schools—be approved or disapproved?

5. Should they be free or supported by the city, county, or State in which they are located?

6. Should they be under the control or partial control of the National Government?

7. Should their instructors be practical men from the ranks of trade occupations, or should they be men who know nothing of the trade itself except its theoretical side?

8. What should be taught under the head of "Industrial education"; the cultural side, the professional side, the mechanical side, or all combined?

9. To what extent, if any, should labor headquarters, labor temples, and labor halls be used to furnish industrial education?

10. To what extent should "prevocational courses" be encouraged.

11. What disposition shall be made of the product of industrial schools?

POINT OF VIEW.

After an extensive as well as intensive study of the entire subject, covering a period of more than three years, examining the many experiments now in vogue, ascertaining through first hand information the purposes and merits of the several types of school systems now prevailing, the committee is prepared to offer the following as a partial solution of the above questions.

In regard to 1—should trade, vocational, technical, and industrial schools be established as a part of the public-school system?

We believe that technical and industrial education of the workers in trades and industry, being a public necessity, should not be a private but a public function, conducted by the public, the expense involved at public cost and as part of the public-school system. In order to keep such schools in close touch with the trades and industries, there should be local advisory boards, including representatives of the industries, the employers, and organized labor.

In regard to 2—should private industrial educational institutions be tolerated?

Organized labor's position regarding the injustice of narrow and prescribed training in selected trades by both private and public instructions, and the flooding of the labor market with half-trained mechanics for the purpose of exploitation, is perfectly tenable and the well-founded belief in the viciousness of such practices and the consequent condemnation, is well nigh-unassailable.

In regard to 3—under what conditions and terms should industrial schools, either public or private, be countenanced and supported?

We believe in private initiative, coupled with active cooperation between the school authorities and the trade unions, or private undertakings which are manifestly for the educational advancement of trade-union members.

In regard to 4—under what conditions should the semiprivate or the semipublic industrial schools, namely, the so-called cooperative industrial schools, be approved or disapproved?

The problem is divided into two parts as follows:

- (a) Public control of cooperative schools.
- (b) Private control of cooperative schools.

As to (a) the cooperative-school plan is an attempt to combine training in the processes and practices of trades, in manufacturing or other establishments, with general instruction in a school which includes theory plus academic studies that bear directly on the trade work. The details of such systems vary, but the most popular is the half-time plan.

While efforts have been made to establish and classify schools to give the various kinds of vocational instruction, little or no attention has been given to the necessity for preparation of both pupil and teacher for such instruction. It therefore becomes desirable to point out that aside from the chasm which seems to exist between the grammar grades and the high school, and the fact that many of the pupils must go to work, there is a subtle, underlying, active something which is largely ignored or lost sight of.

This is believed to be an actual psychological condition, based upon and connected with mergence into manhood. A thorough study of the subject would doubtless establish the fact that this has more to do with the resignations from school at that time than the necessity of going to work or the existence of a possible hiatus between the grammar and high schools, or any other factor.

There is no doubt that the first eight years of school work should be cultural in its nature, because of the fact that a boy's occupational bent is undeveloped and his likes and dislikes are subject to change. His character and habits during these years are in a formative stage.

Boys, with very few exceptions, during this period, do not know what occupations they would like to follow, and to assign them arbitrarily to any particular occupation would be illogical and perhaps vicious. How, then, can we keep them in school a few years longer and give them at least elementary training for some occupation? Obviously, the answer is, through cooperative part-time schools.

A thorough study should be made of the peculiar psychological changes that take place at this period of a boy's life. He should be aided as far as possible to determine, at least tentatively, on a calling for life. The physique, temperament, and intelligence should all be taken into careful consideration in connection with this psychological study, in order to make a helpful, and at the same time useful, suggestion to the boy.

Manual training, as it exists at present, could be sufficiently specialized to afford a tryout to prospective apprentices, thus determining their bent or adaptability to specific trades. This means that the manual-training work would no longer be taught by a professional pedagogue, but by an experienced and practical journeyman, or other person in the trade, with sufficient adaptability and training as a teacher to impart his knowledge, and, at the same time, gain the confidence of the pupils in the practice classes.

As great a variety of occupations should be provided as is possible, depending upon the size of the town or city. In towns and cities having only one high school, it would easily be possible to give a thorough preapprenticeship course of at least two years in certain trades, and for the remaining two years, other courses might be given to that portion of the class that did not take trade or occupational work the

first two years. In this way, the desires of practically all the students could be met.

In the last analysis, industrial education will be measured by intensely practical men of the industrial world, on the basis of skill and intelligence, as developed by these undertakings, to fit the youth of the country for wage-earning occupations. In order to meet this test successfully, apprentices must be trained under real conditions in productive industry, thereby making the cooperative-school plan a necessary feature of our public-school system.

Other reasons why cooperative schools should be a public charge are as follows:

1. Because of the very nature of things, past and present, the general public has confidence in the public-school system.

2. The manufacturer ought not to be expected to run his establishment to teach trades; nor can he be criticized for making "machine specialists" instead of all-around machinists, when one takes into consideration the fact that he is working to accomplish a very definite end; that is, to turn out a product.

3. The public schools should teach the theory of the trade, while the actual practice and processes should be taught in the shop. This method permits of continuous development of capacity and relieves the manufacturer of the expense of the theoretical instruction, and provides a means of weeding out boys who are not adapted to particular trades.

4. By this method the boy, the employer, and the community are benefited. The obligation to provide industrial education of a theoretical nature, therefore, should rest entirely with the public schools.

As to (b)—private control of cooperative schools:

The committee reaffirms its position in condemning any system of public instruction privately controlled, or any scheme of private selection of pupils, and calls attention to the introduction of a plan which is being put into operation in several localities and fostered by manufacturers' associations.

This cooperative scheme is a limited plan for industrial education, carried on between the high school, which engages a teacher for the purpose, one satisfactory to the manufacturers, and a group of the latter who indenture such boys as they desire to have. The idea is, of course, to give a thorough training. But—

(a) The manufacturer is not obliged to take any boys or to keep any boy.

On the other hand, the high school is obliged to educate all duly qualified boys, to give them all that the city provides.

Therefore those who study in such a cooperative course do so on sufferance.

(b) The people have no hand in this plan. No matter how much a father may desire such training for the boy, the city is helpless to do anything, as under this plan the veto power over the boy's right to public industrial education is in the hands of the manufacturer.

(c) The public school must be neutral as to trade unionism. Surely it dare not be hostile. But what is there to restrain one or all the cooperating plants from assuming any attitude, however hostile? They have the right to teach and to foster antiunionism with school-apprenticed boys under them.

(d) A boy who should talk over or agitate for union principles can be instantly deprived of his educational future under this plan; and if his father should be a known union champion, only the good nature of the manufacturer can prevent reprisal in the form of dropping the boy from this course.

(e) The teacher can not help siding with the manufacturers; he can not protest, should he so wish, if they import scabs, strike breakers, or any sworn foes of unions. It is not for the school to say who shall be the fellow workmen of these young student apprentices. If he be a man of principles, he could not take the boys out of such a shop, for they are under bond.

(f) Finally, with a teacher too soft on the side of the manufacturers, we shall see for the first time in a public-school system a spirit new in evil power—a class of schoolboys trained under a thoroughly un-American system of private selection of pupils, based on no public or competitive method, unless the manufacturers so permit.

A system wholly removed from the salutary supervision of the people.

A system which needs no check in prejudicing the favorites of this system against the large excluded class of their schoolfellows, and later against their fellow workmen themselves.

Any scheme of education which depends for its carrying out on a private group, subject to no public control, leaves unsolved the fundamental democratic problem of giving the boys of the country an equal opportunity and the citizens the power to criticize and reform their educational machinery.

In regard to 5—should they (the schools) be free, supported by the city, county, or State in which they are located?

The committee reaffirms its advocacy of free schools, free textbooks, the raising of the compulsory school age, and a close scrutiny of courses and methods of instruction.

In regard to 6—should they (the schools) be under the control or partial control of the National Government?

Results vast in importance and magnitude have come from the action in Congress in 1862, in giving land grants to each State, to be used for State colleges of agriculture and mechanic arts. This appropriation of lands, followed by direct appropriation of moneys in 1890 and 1907, provides these colleges with a fund averaging about \$65,000 per State, or a total of over \$3,000,000 annually. While the funds so appropriated were for a long time used largely for general studies, the subjects of mechanic arts, agriculture, and home economics were finally developed, so that they now compete on nearly equal terms with the literary and scientific courses.

Since most of this fund is in demand to train engineers, technical agriculturists and teachers in the mechanic, agriculture and home economics subjects, comparatively little is available to give school training to those who wish to become experienced workmen, farmers or home-makers.

There is a movement at present, in which labor is taking a prominent part to still further develop education, to which these colleges were dedicated. Since only one college in a State can do little more for our greatly enlarged population, than to provide courses of study for those who are to become technicians, and can not give equal opportunity in liberal and practical education to all of the industrial

classes, this new movement is crystallizing around a plan for including the secondary public schools under the scope of additional similar grants, thus creating and giving direction to a complete national scheme of education, in which labor should receive recognition and its just share of attention.

In regard to 7—should their instructors be practical men from the ranks of trade occupations, or should they be men who know nothing of the trade itself except its theoretical side?

The committee believes that experience in European countries has shown that academically trained teachers have been dismal failures; notwithstanding this experience, many so-called trade or vocational schools in the United States have, in the recent past, attempted experiments with academically trained teachers with very unsatisfactory or disastrous results.

The teachers of trades and manual vocations must keep up with modern shop practices and processes in establishments which are doing regular productive work; otherwise they will fall far behind and be teachers of obsolete methods and processes. Successful teachers must be men of practical experience, with more than a text-book acquaintance with the industrial world.

A good trade teacher needs at least a fair general education, with specialized knowledge of such arts or sciences as may be related to the trade he is to teach; a practical knowledge of the trades such as is usually gained only by working at them under ordinary shop conditions, and in addition an understanding of the general principles of teaching, that he may be able to impart his knowledge to others. The combination is not a common one. To be a skilled trade worker presupposes years of training and experience in the shop, and men possessing this have usually begun work by 16, with only a grammar school education at most. Even if they have added to this by night study they have had no experience in teaching, and find much difficulty in imparting their own knowledge to learners. The trained teachers, on the other hand, while thoroughly familiar with the theory and underlying principles of the trades, usually lack concrete and practical experience with industrial processes. As a general rule, therefore, the school has to choose between the skilled worker not trained as a teacher and the professionally trained teacher, who knows the theory of the trades, but has little, if any, practical experience.

In regard to 8—what should be taught under the head of "Industrial education"—the cultural side, the professional side, the mechanical side, or all combined?

The committee believes that the course of instruction in a school giving industrial education should include English, mathematics, physics, chemistry, elementary mechanics, and drawing; the shop instruction for particular trades and for each trade represented; drawing, mathematics, mechanics, physical and biological science applicable to the trade, the history of that trade, and a sound system of economics, including and emphasizing the philosophy of collective bargaining. This, it is believed, will serve to prepare the pupil for more advanced subjects, and, in addition, disclose his capacity for a specific vocation.

In regard to 9—to what extent, if any, should labor headquarters, labor temples, and labor halls be used to further industrial education?

The committee is convinced that there are conspicuous activities throughout the country known as "educational hours" at central labor union meetings, which might well be exemplified to advance and organize a propaganda for industrial education. Such meetings might also be turned into an educational "forum" in the interest or advocacy of membership by trade unionists on both State and municipal educational boards and committees.

In regard to 10—to what extent should "prevocational courses" be encouraged?

For more than a decade the introduction of properly balanced courses in trade training and the enrichment of these courses have embarrassed the advocates of industrial education not a little; in fact, attempts to scientifically analyze processes and practices of the trades have met with resentment on the part of superintendents, supervisors, and foremen of large industrial establishments. The reason for this resentment is that those usually seeking such information are manual-training schoolteachers, unfortunately the greater number of whom are women. Moreover, it is conceded that such teachers have very little sympathy with trades, as such, but look upon manual and trade instruction as a way out of the difficulty of educating the sub-normal pupil. Hence, the objection of those interested in trades or trade education to thrusting upon industry the dull boy.

On the other hand, even public trade school instructors in some instances have turned a deaf ear to what they call impertinent inquiries as to methods of procedure. Such instructors usually consider the proper kind of equipment, processes, and practices necessary for the training of apprentices "their stock in trade." However, insistent demand that rule of thumb methods be abolished has resulted in genuine attempts to teach the trades scientifically, systematically, and sympathetically.

As a result of this new era in the advancement of scientifically arranged courses with the necessary equipment, it seems eminently proper at this time to point out the overwhelming desire on the part of advocates of manual-training schools to establish within such schools and elsewhere "prevocational courses" for pupils between the ages of 12 and 14.

While we welcome practical courses for those who are to later enter upon specialized vocational and industrial courses, we maintain that "prevocational courses" should be taught by tutors with practical knowledge of the vocations toward which the pupils are to be pointed; in other words, we can not too strongly condemn any attempt to thrust upon school systems courses of instruction which presumes to try out the adaptability of the pupils for particular vocations and which are taught by women teachers with absolutely no practical knowledge of the metal, woodworking and such other trades for which instruction may be offered.

If "prevocational courses" are to be offered in publicly administered schools in an effort to establish a scheme of vocational guidance, then we insist that such courses be given by men tutors, who not only have a practical knowledge of the particular trades, but in addition, teaching experience coupled with an insight into the adaptability and inclination of the pupils for such vocations.¹

¹ Same to apply to trades and vocations in which women are exclusively employed.

Finally, we favor and advocate increasing the number of men-teachers in industrial schools, as well as "prevocation schools" to the end that all practical instruction in trades be given by properly trained teachers who have had in addition to their teaching experience at least four years practical experience at particular trades.

In regard to 11—what disposition shall be made of the product of industrial schools?

A most serious and troublesome question arises concerning the disposition of the product of industrial schools. If the teaching of any trade in its entirety is to turn out journeymen, near journeymen, or all-round workmen, then there must necessarily be a product which will have a commercial value. If it is not, the work has not been carried on as it would be under real commercial conditions and the training therefore is imperfect.

If the product of these schools is to be put upon the market in any way, there is likely to be much opposition from manufacturers, contractors and organized labor. Since it will inevitably come into competition with the product of regular establishments, it has been pointed out that if the students were regular apprentices in industrial establishments, they would be working as much in competition with apprentices and journeymen in other establishments, as if they were doing the same kind of work and producing the same kind of articles in the schools. This meets the objection only partially from the standpoint of labor and not at all from that of the employer. In both cases, the objection is to what may be called subsidized competition; competition which is not hampered by the necessity of making its product pay for its own cost of production. The difficulty does not, of course, arise in apprenticeship schools in which a manufacturer trains his own employees, but in philanthropic and public industrial schools, it presents a serious problem, for which as yet no satisfactory solution has been found.

As previously stated in this report, the committee believes that instruction should be given for its educational value or, in other words, it should be "construction for instruction, rather than instruction for construction."

An agreement between school authorities and contractors who are erecting public buildings, whereby pupils of schools given instruction in building trades, shall be permitted during a part of the time to make practical application of their training, on buildings in course of erection, the pupils to receive credit for such work as part of their course, has been suggested as a feasible and unobjectionable plan. Similarly the work under the various city departments, has been suggested to provide practice for pupils in many other trades.

This in no way is a new experiment, as practical application of the same is being made in foreign countries with considerable success.

A minor difficulty in connection with a product having a commercial value is the temptation to increase output by keeping the student longer at one machine or operation than is absolutely necessary for practical educational purposes, in other words, there may be a tendency, for the sake of revenue, to follow the example of the shop and specialize instead of giving well-rounded training. This, however, is a matter of school administration but, nevertheless, of great concern and can be easily guarded against if the right attitude is shown by school administrators.

RECOMMENDATIONS.

The committee, after due consideration of the importance of the several systems of schools now in operation throughout the country, recommend the following specific types of schools for the advancement of the prospective apprentice to the trades, as well as for those who have already entered the trades:

1. Supplemental technical education: Supplemental technical education for those already in the trades. The demand for such instruction is measured by the necessity for training in particular trades and industries, and the chief aim of such instruction should be to present those principles of arts and sciences which bear upon the trades either directly or indirectly. Such schools are commonly known as continuation schools, whether their sessions are held in the day, evening, or on the part-time plan.

2. Industrial education: The establishment of schools in connection with the public-school systems, at which pupils between the ages of 14 and 16 may be taught the principles of trades, not necessarily in separate buildings but in schools adapted to this particular education by competent trade-trained teachers.

3. Trade-union schools: The committee recommends the continuance of progressive development in supplemental trade education as inaugurated by trade-unions, such as the supplemental trade courses established by the International Typographical Union; technical courses of the Photo-Engravers' Union; School for Carpenters and Bricklayers, Chicago, Ill.; the International Printing Pressmen's Technical School, at Rogersville, Tenn.; and the School for Carriage, Wagon and Automobile Workers, of New York City. The committee further recommends that all trade-unions which have not adopted a scheme of technical education give the matter the consideration it so richly deserves; and they further believe that the undertakings of the above unions call for the most enthusiastic admiration and are entitled to the most cordial and loyal support.

4. We finally recommend that if in the course of time schools under public administration with a broad and liberal course of instruction (with an advisory committee composed of employers as well as trade-unionists) shall demonstrate practical efficiency in training workers for the highly skilled trades, we favor the recognition of that portion of time spent in the schools which, after an examination by the union at interest of the practical and theoretical ability of the apprentice, can be considered comparable to actual training in particular trades as a substitute for a period of the apprentice's time spent entirely in the industry.

CONCLUSIONS.

The committee believes that there are pressing educational needs which can at least partly be solved by the introduction of industrial training. At present a very large proportion of the children leave school between the ages of 14 and 16. They change from one occupation to another, having no particular qualification for any vocation, and gain little in efficiency. Industrial education between the ages of 14 and 16 ought to awaken a new school interest and help to retain them longer in school; moreover, if industrial training took the

children between the ages of 14 and 16, when they are of little value in a business way and at a time when such education as they have received is of advantage to them so far as it goes, but hardly fits them for actual working places, then it would give them the proper training to prepare them to enter some branch of trade or vocational work. At the time our present public-school system came into operation it met the needs of the people; the industries were carried on in the home, and the children were taught the manual arts there; the boy was taught his trade by his father, and the girl and her mother carried on in the home much of the work now performed in the factory. Economic conditions have changed and the schools must change with them. The ranks of skilled labor are being depleted and the work of the trades is being done by unskilled men or semi-skilled machine specialists.

The trade unions have been waiting in vain for 25 years for the manual-training schools to furnish recruits to the "depleted ranks" of skilled labor. It is time now to take steps to bring back the standard of efficiency. We want a system which will develop the labor power of our people so that every worker may become interested in his work and approach the limits of human efficiency. Our public-school system of to-day teaches too much and educates not enough, and fails entirely to prepare its pupils for productive labor. It must be changed, and quickly, and the change must be radical. We can not add a few experiments in trade training in our larger cities or introduce intense manual training in manual-training school departments to supplement a Latin and Greek curriculum. Our boys and girls must leave school thoroughly prepared by industrial training to do well some kind of productive work. A healthy community is impossible without the union of the schoolhouse, the home, and workshop. Modern life has not yet accommodated itself to the great revolution of our industrial system. Nothing but a thorough industrial education and understanding of economical interest of society can lead to the necessary union between labor and capital and give peace and prosperity to the present disturbed and suffering industrial world.

We believe that the education of workers in trade or industry is a public necessity, and that it should not be a private but a public function, conducted by the public and the expense involved at public cost.

We are opposed to the plan in operation in some places of having public instruction privately controlled. In such schools the boy receives his trade instruction only on sufferance of the manufacturer, and often he is surrounded by an atmosphere hostile to organization and expelled if suspected of union tendencies.

The State has provided schools to teach trades to the mentally, morally, and physically deficient; our corrective institutions, orphan asylums, and blind schools are equipped to teach useful occupations. By what right can we refuse the same chance for the normal boy or girl? Would it not be more sage to engrain industry upon our public school system, and rather prevent pauperism, crime, and premature orphanage than make them the bridge to industry? We think so, and we do not beg it as a favor, but we demand it as a right. The 90 per cent who are going into manual occupations have the same right to the best preparation for their life's work that the State can give them as has the 10 per cent who go into the professions.

Organized labor is concerned also with who the teachers in these schools shall be. Men who have had only theoretical training do not and can not make effective teachers of trades. We do not wish to be misunderstood, we do not belittle or underestimate the value of theoretical training, we regard it as necessary, but theory must be combined with practical experience. The potential workman must be brought in contact with the man who has actually done things and who knows how and why he did them. Who can not only build a machine, but having built it can make it go, can give that training of attention that is acquired in having to do things with a real motive behind and a real outcome ahead. And not only must the teachers be men and women of practical experience, but so also must those who are to direct them. It is hardly to be expected that the executive head of a trade school can successfully direct the activities of that school and dictate its policy if that person has only text book acquaintance with the great industrial world. They, too, must be people who have actually come in personal contact with the problems for which they are trying to find a solution.

We are opposed to any system which turns out not machinists but machine specialists. Specialization in the industrial world is very different from professional specialization. Instead of being at the top of his trade, your machine specialist is at the bottom, if indeed he can be considered as in the trade at all. He is a man who can do but one thing, and who knows little or nothing of the general principles of his trade. His whole efficiency is spelled "s-p-e-e-d."

We would protest, also, against those schools operated for profit, which advertise short cuts to the trades. They are turning out not even machine specialists, but are flooding the labor market with half-trained mechanics for the purpose of exploitation. There is a growing feeling which is gaining rapidly in strength, that the human element must be recognized, and can not be so disregarded as to make the future workmen either inefficients or mere automatic machines.

While we are willing to subscribe to any plan that offers efficient and practical instruction in productive operation, we do insist that emphasis must be placed upon education rather than upon product. The youth must not be exploited in the name of education. There must be the minimum of product and a maximum of education. In short, during the period of education it ought to be "construction for instruction, rather than instruction for construction."

One of the great troubles in America to-day is that too many of our wage earners are misfits industrially. It frequently happens that in the matter of selecting a vocation or trade the individual is consulted too little. His trade is selected for him because it seems to provide lucrative employment or because it was the trade of his father and not because there is anything in the work which appeals to him. He is summarily shot into a trade regardless of his adaptability to it; result, he goes through his life a misfit and mediocre workman, not because he lacked ability, but because his energies were misdirected. We must have a system whereby the boys and girls of the country may have an opportunity to acquire educated hands and brains such as may enable them to earn a living in a self-selected trade or vocation and to acquire an intelligent understanding of the duties of good citizenship. The training for citizenship

(the teaching of civics) is woefully neglected in practically all trade and vocational schools. The schools that are run for profit and the corporation schools say frankly, "Our business is to teach the trade, to turn out men who can do the work; beyond that we have no concern. Whether they can cast an intelligent vote or not does not interest us." Some of the philanthropic and public schools make a feeble attempt at teaching civics, but very few of them are getting anywhere. In most cases the human side is lost sight of. We want the boy (and girl) to be taught the fundamentals of civics, the meaning of government, and the reason that law must be obeyed. He must be taught what the result of ungoverned emotion or uncontrolled action of any kind will be. He must be made to realize that the boy of to-day is the voter of to-morrow and that he has obligations to society which he must discharge, and in order to discharge them he must be taught broader views of citizenship and ideals of right and clean living.

He should be taught something, too, of his own economic value. He must understand the value of collective bargaining and of how to adjust his relations with his employer. If our boys were instructed in such matters before they enter the competitive field there would be fewer labor disputes. We want men as well as mechanics.

PROGRESSIVE ATTITUDE OF THE AMERICAN FEDERATION OF LABOR TOWARD VOCATIONAL EDUCATION.

The American Federation of Labor first appointed a committee on education at its twenty-third annual convention in 1903. This committee, however, considered only the work in manual training and technical education which was to be done by the unions themselves, and concluded that "the subject of manual training and technical education to be given by trade unions is of such a general character that this convention could not very well recommend any plan or policy that would apply equally to all unions, on account of the diversity of conditions and difference in skill required." A committee was appointed in 1904 and one again in 1905, but neither ever reported.

The committee on education of the twenty-sixth convention, 1906, again recommended that the committees already appointed conduct investigations into the subject of apprenticeship, the graduates of the trade schools, manual training, and schools of technology. The recommendation was adopted without discussion. These various resolutions serve to show that the organization was becoming interested in the subject, as it had always been in other phases of education, but the trade-school proposition, with other phases of industrial education, was first brought squarely before the American Federation of Labor at the Norfolk convention, November, 1907. The secretary of the National Society for the Promotion of Industrial Education addressed the convention on the second day of its session, when a resolution was introduced stating the policy of the federation in the following words:

Whereas an organization has been formed, known as a National Society for the Promotion of Industrial Education, having for its object the raising of the standard of education along industrial lines; and
Whereas some misapprehension exists in many quarters as to the attitude of organized labor upon this subject: Be it, therefore,

Resolved, That this, the twenty-seventh annual convention of the American Federation of Labor, having in mind the experience of many of our national unions with the so-called trade school, which attempted to teach a short cut to trade and which on some occasions was used as a weapon against the trade-union movement, do not favor any movement having this ulterior object in view; and be it further

Resolved, That we do indorse any policy, or any society or association, having for its object the raising the standard of industrial education and the teaching of the higher technique of our various industries.

The resolution was referred to the committee on education. It reported that it—

Decided to record itself in favor of the best opportunities for the most complete industrial and technical education obtainable for prospective applicants for admission into the skilled crafts of this country, particularly as regards the full possibilities of such crafts, to the end that such applicants be fitted not only for all usual requirements, but also for the highest supervisory duties, responsibilities, and rewards; and your committee recommends that the executive council give this subject its early and deep consideration, examining established and proposed industrial school systems, so that it may be in a position to inform the American Federation of Labor what in the council's opinion would be the wisest course for organized labor to pursue in connection therewith.

The report of the committee was adopted.

The executive council proceeded as instructed, securing its information chiefly by correspondence, and in its report to the twenty-eighth annual convention, 1908, reported very briefly on schools recently established, and recommended that all correspondence and material on the subject be turned over to a committee for report and further recommendation.

The committee on education made a report on the portion of the report of the executive council just noted and clearly summed up the situation as viewed by it, concluding with recommendation for a special committee to consider the subject, as follows:

We note with satisfaction the splendid progress accomplished by the executive council along the lines of industrial education, carrying out the instruction of the Norfolk convention. Much data and material have been brought to hand and referred to your committee. But your committee feels that in no sense with the limited time allotted can they make a complete report on the value of the mass of material referred to them on this subject, and we can best submit our recommendations in the following resolution:

“Whereas industrial education is necessary and inevitable for the progress of an industrial people; and
“Whereas there are two groups with opposite methods and seeking antagonistic ends now advocating industrial education in the United States; and
“Whereas one of these groups is largely composed of the nonunion employers of the country who advance in industrial education as a special privilege under conditions that educate the student or apprentice to nonunion sympathies and prepare him as a skilled worker for scab labor and strike-breaking purposes, thus using the children of the workers against the interests of their organized fathers and brothers in the various crafts; and
“Whereas this group also favors the training of the student or apprentice for skill in only one industrial process, thus making the graduate a skilled worker in only a very limited sense and rendering him entirely helpless if lack of employment comes in his single subdivision of a craft; and
“Whereas the other group is composed of great educators, enlightened representatives of organized labor, and persons engaged in genuine social service, who advocate industrial education as a common right, to be open to all children on equal terms, to be provided by general taxation and kept under the control of the whole people, with a method or system of education that will make the apprentice or graduate a skilled craftsman in all the branches of his trade; and
“Whereas organized labor has the largest personal and the highest public interest in the subject of industrial education, and should enlist its ablest and best men in behalf of the best system, under conditions that will promote the interests of the workers and the general welfare: Now, therefore, be it

"Resolved, That the president, in conjunction with the executive council of the American Federation of Labor, be, and is hereby, authorized to appoint a special committee of at least 15, to be composed of a majority of trade union members of this convention, who will serve without compensation and incur no expenses other than necessary and legitimate expenditure within the judgment of the president and executive council, to investigate the methods and means of industrial education in this country and abroad, and to report its findings, conclusions, and recommendations to the next annual meeting of the American Federation of Labor."

The recommendation of the committee was concurred in and the special committee appointed.

The president in his report to the Toronto convention in 1909 clearly stated the position of the federation. He referred to the attempt of the National Association of Manufacturers to give the impression that organized labor is opposed to all industrial education. He asserted that American labor is in favor of true public industrial education, but stated its opposition to narrowly specialized training under control of private interests.

The executive council reported the appointment of the special committee of 15, authorized by the previous convention. This special committee reported to the convention through its chairman that it had held meetings in New York City, Washington, D. C., and Toronto, Canada. It stated its task, in accordance with the terms of the resolution under which it was appointed, to be:

First. A thorough investigation of the needs of industrial education;

Second. A statement of the extent to which needs are met by existing institutions; and

Third. As a result of such investigations, some definite suggestions for the promotion of industrial education in such manner as might best serve the interests of the whole people.

The committee also reiterated the opposition of organized labor to any schemes of industrial training, public or private, which do not give thorough training in craftsmanship, but only the superficial training which serves to furnish strike breakers.

The trend toward the introduction of schemes of industrial education and apprenticeships at public as well as private expense, which pretends to teach trades in periods ranging from four months to four years, and turn out graduates in times of industrial peace who are able to earn only 50 per cent of the established wage in a given trade and in times of industrial dispute are exploited in the interests of unfair employers, is worthy only of condemnation.

It briefly reviewed the history of the appropriations for the land-grant colleges, and asserted that such schools fail to benefit the large mass of citizens of the States.

It emphasized its judgment of the importance of the whole problem in the following conclusions:

It is believed that the future welfare of America largely depends on the industrial training of our workers and in protecting them.

The inquiries of the committee seem to indicate that if the American workman is to maintain the high standard of efficiency, the boys and girls of the country must have an opportunity to acquire educated hands and brains, such as may enable them to earn a living in a self-selected vocation and acquire an intelligent understanding of the duties of good citizenship.

Reference was then made to the present unsatisfactory school situation, where the great majority never complete the grades,

because of lack of interest on the part of the pupil and dissatisfaction on the part of the parent because the schools "do not offer instruction of a more practical character." Emphasis was put on the need of a healthy public sentiment which should hold the trades to be honorable vocations, and eradicate the false ideal of the superiority of clerical occupations.

The committee crystallized its views in the following recommendations:

The importance of this kind of school for those who have already entered the trades has been a matter for serious consideration by the committee.

The demand for such instruction is measured by the necessity for training in particular trades and industries, and the chief aim of such instruction should be to present those principles of arts and sciences which bear upon the trades and industries, either directly or indirectly.

The economic need and value of technical training is not to be disregarded, and cognizance should be taken of the fact that throughout the civilized world evening and part-time day technical schools enroll 20 pupils to every one who attends the other types of vocational schools.

And the committee submits for consideration and discussion to the convention the proposition that there be established, at public expense, technical schools for the purpose of giving supplemental education to those who have entered the trades as apprentices.

We favor the establishment of schools in connection with the public-school system at which pupils between the ages of 14 and 16 may be taught the principles of the trades, not necessarily in separate buildings but in separate schools adapted to this particular education, and by competent and trained teachers.

The course of instruction in such a school should be English, mathematics, physics, chemistry, elementary mechanics, and drawing. The shop instruction for particular trades, and for each trade represented, the drawing, mathematics, mechanics, physical and biological science applicable to the trade, the history of that trade, and a sound system of economics, including and emphasizing the philosophy of collective bargaining. This will serve to prepare the pupil for more advanced subjects, and in addition to disclose his capacity for a specific vocation.

In order to keep such schools in close touch with the trades there should be local advisory boards, including representatives of the industries, employers, and organized labor.

The committee recommends that any technical education of the workers in trade and industry being a public necessity, it should not be a private but a public function, conducted by the public and the expense involved at public cost.

The committee further recommended the continuance of its life to the convention of 1910; that the United States Department of Commerce and Labor be requested to investigate the subject here and abroad; that the committee cooperate with the Department of Commerce and Labor; and that affiliated organizations of the American Federation of Labor furnish all information possible on the subject.

The report was referred to the committee on education, which concurred in its recommendations, including the continuation of the special committee to the 1910 convention, and further recommended that sufficient copies of the report be printed for distribution to affiliated organizations. The report of the committee was adopted.

At the thirtieth annual convention held in 1911 the committee authorized by the Denver convention made no report, but a special committee on industrial education was appointed to review its work. The special committee made the following recommendations, which were unanimously adopted by the convention:

Your committee recommends the continued advocacy of labor's bill for vocational education—known as the Dolliver bill—which, as you will recall, provides for educational cooperation between the State and Federal Governments and for State and Federal control and supervision of public industrial education.

It recommends, also, that the special committee appointed by authority of the Denver convention be continued, and that that committee "be urged and authorized to prosecute their investigation, and to lend their every assistance to the accomplishment of the extension and completion of comprehensive industrial education in every field of activity."

TRADE UNION SCHOOLS.

The establishment of the Printing Pressmen's Technical Trade School, following the example set by the International Typographical Union, marks another epoch in the introduction of trade education by trade unions.

That the typographical union and the printing pressmen should be the first trades unions to establish such schools was a foregone conclusion, for in proportion as occupation makes claim on the intellect of the workers greater educational opportunities become necessary.

Those trades which call for the greatest intellectual or technical skill on the part of the worker afford the most available opportunities for educational activity.

It is not because the personnel in the printing trades is better, but rather because these occupations are becoming increasingly more technical and subdivided in their character.

It is confidently expected that the photo-engravers and bookbinders, will be the next to establish opportunities for their membership to secure practical technical and trade education, as already both of these organizations have taken definite steps in this direction.

Probably the most progressive step taken by any international organization with reference to the education of its apprentices, without actually providing schools for the same, has been taken by the Pattern Makers' League of North America. A copy of their apprenticeship rules follows:

All apprentices who have been such for a period of one year, after examination by the executive committee, shall be eligible for membership.

During his apprenticeship he shall attend a school teaching technical courses such as will fit him to become a practical and competent journeyman (such schools to be approved by the association). The apprentice should graduate in such studies before the expiration of his apprenticeship.

Each apprentice who has worked one year at pattern making and has proven his capacity for learning the trade shall be eligible for membership in the association on the payment of an initiation fee of \$1. Before admission the apprentice shall be approved by the men in the shop and by the executive committee of the association, and must show that he entered the business at the required age and is properly registered in a school teaching technical courses, as deemed necessary by the association to educate the apprentice in order to make a practical and competent mechanic.

TECHNICAL TRADE SCHOOL OF THE INTERNATIONAL PRINTING PRESSMEN AND ASSISTANTS' UNION OF NORTH AMERICA.

The Printing Pressmen's Technical Trade School was founded in conformity with a resolution adopted at the twenty-third annual convention of the International Printing Pressmen and Assistants' Union of North America.

The school was formally established in June, 1912, at Rogersville, Tenn., with an enrollment of 18 resident students and a waiting list of more than 200 applicants as resident or corresponding students. It had been planned to open the school late in the year 1912, but insistent demand by prospective students made it necessary to hasten the opening.

The first step in connection with the establishment of the school was taken at the twenty-second annual convention of the international union. That convention authorized the appointment of a commission of five to investigate and report on the feasibility of the establishment of a school for the members of the union. The commissioners, after an exhaustive study of the necessity for trade and technical education for the members of the union and an investigation of methods for the promotion of such an education, reported to the following annual convention. The convention accepted the report and authorized the commissioners to establish a school, the scope of which is as follows:

1. That the commissioners be instructed to establish a school of technical education, to be operated upon the following basis:

(a) Cause to be placed in operation sufficient machinery along lines as recommended, by Chairman Cashion, whereby practical demonstration can be had by our membership attending the school, and practical demonstrations to be made for those taking the correspondence-course. That the said school shall be located in the city of Chicago in order to conform with offers made (and to be able to accept) by manufacturers of printing machinery. That there be set aside sufficient funds by the international union, and the income from the American Pressman (over and above the expense) for the operation of said school. This fund to be known as the American Pressman and technical education fund.

(b) That there be appointed by the international board of directors (approved by the present technical-education commission) three trustees of said commission, with the editor of the American Pressman, who shall be chairman, the president, and the secretary treasurer of the international body. Said members to constitute trustees for the operation and maintenance of the technical school of education, and that said trustees, or their successors, excepting the president and secretary of the international union, and the editor of the American Pressman, to be selected by referendum vote of the international union to be held for the election of international officers in 1912.

(c) Said trustees to be empowered to select a general superintendent and chief instructor, who shall, under the direction of the trustees, be empowered to operate the school and employ such other assistants and make such other arrangements for operation of same as may be most practical for the advancement of same.

(d) That the secretary-treasurer of the international union shall be the secretary-treasurer of the trustees, and of the fund to be known as The American pressman and technical education fund. Said trustees shall cause to be made a bond in the interest of the International Printing Pressmen and Assistants' Union for the sum of not less than \$5,000, the expense of same to be borne by the fund; and that all disbursements shall be made by check, and by the secretary-treasurer, and countersigned by the president of the International Union and the chairman of the trustees.

2. That the school shall be operated on the following basis:

(a) That only members of the International Printing Pressmen and Assistants' Union in good standing shall be eligible for a course of education in the institution.

(b) That there shall be a correspondence course, followed up by drawings and demonstrations, in a manner most practical for the education of the members; and that the basis of cost of same, which is recommended by the commissioners, be: Three months' course, \$5; one year's course, \$15; life course, \$25; the same to be paid in advance.

(c) That there shall be a practical demonstration course. Students desiring this course can enter the institution and receive direct instruction, said course to be \$30. The time allotment to be determined by the chief instructor.

3. That for the economical operation of said institute, all possible arrangements to be made for getting out official work of the International Union in the institution.

4. That the secretary-treasurer of the international union shall make quarterly reports of the financial receipts and expenditures, and that same shall be duly compiled and presented to the annual convention of the international union.

5. That the operation of The American pressman in connection with the advancement of the technical education program as heretofore stipulated shall not have for its object the changing of any of the laws dealing with the operation of The Pressman, except in connection with the financial requirements, and in this it is hereby provided that arrangements of salary, percentage, etc., now being provided for by the laws for the editor and manager, shall continue in operation, and further, that all funds

over and above the expense of The American Pressman and technical school shall revert to the general fund of the International Printing Pressmen and Assistants' Union at the end of each fiscal year.

TERMS AND COURSE OF INSTRUCTION.

The privilege of admission to the school and of subscription to the correspondence course in presswork is confined to members of the International Printing Pressmen and Assistants' Union. The rates of tuition are as follows: The six weeks' course of practical demonstration for those attending the school, \$30; correspondence course, three months, \$5; one year, \$15.

The course of practical demonstration is arranged to conform to each student's particular needs, being based on his knowledge of the craft acquired previous to entering the school.

The correspondence course is intended not only for those who, from lack of time or other reasons, can not attend the school but also for those who desire a wider knowledge of presswork than they can acquire in the six weeks' practical demonstration. As may well be imagined the correspondence course will be complete, up-to-date, and practically exhaustive. It will thoroughly cover the subjects of paper and other printing surfaces, inks, varnishes, reducers, driers, forms of all sorts, type, machine-set matter, electros, zinc etchings, half tones, process plates, etc., presses of all sorts, electricity preventives, rollers, and all styles of make-ready, etc. The correspondence course will be, in short, an encyclopedia of presswork and much more elaborate than any previous work of a similar nature, in this or allied fields, ever attempted.

In order to place the correspondence course in the hands of subscribers as soon as possible and also to keep it thoroughly up to date at all times, it will be furnished in loose-leaf form, in installments as rapidly as each installment can be completed. The choice of and the furnishing of a loose-leaf cover will be left to the subscriber, and the first installment and successive installments can be included between the same covers by the subscriber, as all installments are to be printed on sheets of uniform size, with holes for the loose-leaf binder punched along the inner or binding edge.

At the present time three and four color process printing and rubber offset printing seem to most interest the membership. These subjects will be covered, of course, but it is not the intention of the school merely to perfect the student's knowledge of any one process. Special knowledge desired will be furnished first and afterwards information necessary for a wider and more complete mastery of the craft will be supplied.

Any one who has attended the school or taken the correspondence course will be welcome to ask questions concerning presswork, with the assurance of a prompt reply.

By taking advantage of the elastic feature of the loose-leaf book, the course may be kept thoroughly up to date at all times, which would be manifestly impossible should an attempt be made to cover the subject of presswork in a single volume as ordinarily bound.

The correspondence course in presswork will in itself be a specimen book of presswork, not only telling but showing the subscriber how to print various sorts of forms in various sorts of ink (and in various colors), on various papers and other surfaces of various colors by using different presses and methods of make-ready.

The lessons comprise a study of the various operations, processes, and practice in presswork and are as follows:

Press operation and suggestions for the beginner.—The two-revolution flatbed cylinder press, the air springs, setting the cylinder and bed-bearers, adjusting the side bed guides or gibbs, to adjust register rack, placing the packing on the cylinder, shrinking the packing, gauging thickness of make-ready, adjustment of the grippers and shoefly, adjustment of sheet bands, setting the feed guides, to set the paper slitter, setting the rollers, setting the ink fountain, make-ready on the cylinder press, underlaying, overlaying, cut overlays, hints on underlaying and overlaying, causes of slur and the remedies, how to secure and retain register, three and four color process printing, composition rollers, flat color printing, platen presswork, platen press rollers.

SCHOOL EQUIPMENT.

Pressroom.

One 45-inch Seybold cutter, equipped with a 3-horsepower Crocker-Wheeler motor.

One 44 $\frac{1}{2}$ -inch Dexter cutter, equipped with a 2-horsepower Crocker-Wheeler motor.

One Harris offset press with 3 $\frac{1}{2}$ -horsepower Triumph Electric motor, including Harris automatic feeder operated by $\frac{1}{2}$ -horsepower motor for blower, connected with Kohler controlling system.

One Hoe offset press, equipped with a Dexter automatic feeder and 3 $\frac{1}{2}$ -horsepower Roth Bros. & Co. motor, with one monitor controlling system for the same.

One transfer press.

One Dexter folding machine, with $\frac{1}{2}$ -horsepower Crocker-Wheeler motor.

One 10 by 15 Chandler & Price platen press, with $\frac{1}{2}$ -horsepower motor attached.

One 8 by 10 Chandler & Price platen press.

One Boston wire stitcher, equipped with small motor.

One perforating machine.

One No. 9 Optimus press, with 3-horsepower Triumph motor.

One Johnson roller rack.

One make-ready table.

One 5-horsepower General Electric motor.

Two Miehle presses, equipped with 3-horsepower Roth Bros. and Crocker-Wheeler motors, respectively.

Pressroom—Continued.

One mechanical chalk relief overlay outfit, complete.

Fifteen tables.

Forty trays.

Nine flat trucks.

Nine waste paper trucks.

Green's rotary type-hi planer.

Melton automatic cooler.

Large consignment of various kinds of ink and paper stock and offset supplies.

Composing room.

One Mergenthaler linotype machine, equipped with $\frac{1}{2}$ -horsepower Swing electric motor.

One Vandercook proof press.

One galley rack.

Two double stands and cases.

One triple stand and cases.

One cabinet and cases.

One cut cabinet.

Two metal-furniture racks.

One cabinet wood furniture.

One imposing stone.

Three tables.

One melting furnace.

One lot of Climax blocks and hooks.

One lot of Warnock blocks and hooks.

One lot upright grain printing bases.

Twenty zinc galleys.

Five brass job galleys.

Platen and book chases.

INTERNATIONAL TYPOGRAPHICAL UNION COURSE OF INSTRUCTION IN PRINTING, CHICAGO, ILL.

This course of instruction in printing was founded by the International Typographical Union, which in 1907 appointed a commission to formulate some method of providing a technical education for journeymen and apprentices in the trade.

The Hot Springs convention of the International Typographical Union adopted the following resolution:

Whereas it is becoming more apparent, year after year, that the apprentices in printing offices are being restricted in opportunities to learn the trade in its principal branches, thereby minimizing their value as journeymen, and realizing the tendencies of foremen, as a rule, to make specialists of the apprentices: Therefore, be it

Resolved, That the executive council of the International Typographical Union is hereby instructed to appoint a commission of three, whose duty it shall be to formulate some system for the technical education of our members and apprentices, and that this commission be not restricted in its efforts in this direction; and, further,

Resolved, That the executive council is hereby authorized to expend such sum of money as in its judgment may be deemed necessary to defray the expense of said commission.

Resolved, That said commission report the result of its work to the next convention of the International Typographical Union.

The commission reported that in the average shop the opportunities for thoroughly learning the trade of printing did not exist. Specialization kept some printers indefinitely on one kind of work and provided but a narrow field of instruction for the apprentice. This circumstance had resulted in a perceptible decrease in skill among printers, who were practically given no opportunity to acquire the mastery of their trade. A second result of this lack of a general training was the necessity of calling on outsiders for some of the work which it was asserted rightfully belonged to the printers. These outsiders are the professional designers, who are trained in art schools, where they have learned the principles of lettering, design, and color harmony, and have been given opportunity to exercise originality.

With all these considerations in view the typographical union realized that the printers needed technical education, and as a central school was not possible, the idea of the correspondence school was adopted as the only practical means of effecting the desired change. The typographical union did not propose "to make printers but to give apprentices, journeymen, and even master printers an education supplementary to that of the printing office."

The commission decided upon a correspondence course, and in doing so determined that the lesson should be sufficiently comprehensive to embrace subjects that can not now be learned in printing offices. That is, the student should be taught the principles of the printing art in such a way as would enable him to master the principles pertaining to harmonious color and type arrangement. This will widen the field for printed matter, creating a demand for labor, and assist printers who desire to take up designing or the development of advertising ideas.

In order that the tutors should be of the best, the union has made arrangements to assume control of the experts attached to the Inland Printer Technical School. There is no cavil as to the excellence of this institution; under union auspices it has in the last few years graduated more than 2,000 machine operators, and the thoroughness and completeness of its instruction in this and other branches, as well as its success, has won the unstinted praise of trade educators.

This course is an effort to teach and disseminate the art principles that underlie good typography. It is imparted by correspondence, the student being given personal instruction and criticism of his work by expert instructors. First-class display or decorative typography

is not a matter of taste, but results from expounding (usually unconsciously) the well-known principles of design. They are familiar to the commercial artist and in the course they are made clear to the craftsman, it being written by printers for printers.

The lessons are arranged logically for the man or youth with office experience. Principles are expounded first and then the student solves problems in practical work (either in type or by sketches, as best suits his circumstances) under competent instructors. This, notwithstanding it is a new idea in typographical education and introduced in a novel way. The course is open to any person engaged as a compositor. The course prepares the compositor for the work of to-day or to-morrow, is logically arranged, and begins with making the real tools of the printer—letters; shows, through a study of the principles of design, the how and the why of display work; equips compositors to do the work of the designer; insures better results, as ability to design and execute are thus coordinated; elucidates color harmony in a scientific though simple manner by a printer for printers; gives thorough training in all descriptions of display or decorative typography, after the student has been drilled in underlying principles which he applies to his work, which thereby become his own production, not an imitation of some other compositor's work; is imparted by a universally commended system of correspondence, which insures close personal attention not possible by the class method of instruction, and insures the student the best advice on trade problems as long as he remains at the trade.

This course makes an especially strong appeal to the victims of specialization, who are now at one branch of the trade and that not a very skillful or lucrative branch. The prevailing system of apprenticeship deadens the initiative where it is alive and allows it to remain dormant where it is not highly developed.

The course consists of 37 lessons, as follows: The first nine have to do with lettering, lessons 10 to 14 treat of design; 15 to 19 treat of color harmony, and the next 11 lessons on composition of various kinds, and the remaining 7 lessons consist of information on paper making, plate making of various kinds, and imposition.

The course covering 37 lessons the student printer completes according to his leisure and his ability. All students pay a tuition fee of \$23 in advance, or \$25 if tuition is paid in installments.

The subjects are as follows:

Lettering: Including Roman capitals in pencil, Roman lower case in pencil, italic in pencil, inking in Roman capitals, inking in Roman lower case, inking for italic, Gothic alphabets, making cover-page design.

Design: Balancing measures, proportion, shape harmony, tone harmony, preliminary sketches or arrangements of lines and masses.

Color harmony.

Composition: Including letterheads, billheads, business cards, envelope corner cards, tickets, menus, programs, cover pages, title-pages, advertisements, layout of booklets and books.

Papermaking.

Plate making of various kinds.

Imposition: Including 4 and 8 page forms, 12 and 16 page forms, 24 and 32 page forms, and forms for folding machines.

The instruction aims to so qualify journeymen and apprentices that they can do any form of printing that comes into their shop. The only requirement for enrollment is that applicants must be

compositors, whether journeymen or apprentices. During 1911-12 the school had 3,092 pupils enrolled.

SCHOOL FOR CARPENTERS' APPRENTICES IN CHICAGO, ILL.

In 1907 the need for better training among carpenters' apprentices was strongly felt by the unions and by contractors and builders.

Upon application to the board of education, and by agreement between the board and the arbitration board of the employing carpenters and carpenters' unions of Chicago, it was arranged to have certain public schools open for the instruction of carpenters' apprentices during three months of each year. As a result, separate classes for carpenters' apprentices were conducted in two public day schools, namely, the Horace Mann School and the James Otis school. The joint arbitration board extended the arrangement for instruction to the Central Young Men's Christian Association, the Lewis Institute, the Pullman Evening School, and the Chicago Technical College.

The following rules laid down by the joint arbitration board, which is given jurisdiction over apprentices, show the general plan along which the employers, unions, and the apprentices work:

The contractor taking an apprentice should engage to keep him at work in the trade for nine consecutive months each year, and see that during the remaining three months of the year the apprentice attends school during January, February, and March, and a certificate of attendance from the principal of the school attended must be furnished to the joint arbitration board as a compliance with this requirement before he is allowed to work during the coming year. A contractor taking an apprentice should keep him steadily at work or at school; failing to do so, he should pay him the same as though he had worked. In case an apprentice at the end of his term of four years, for want of proper instruction in his trade, is not a proficient worker, and if, after a thorough investigation, the joint arbitration board find that the contractor to whom he was apprenticed did not give him proper instruction and an opportunity to learn his trade, he may be required to serve another year with whom he and the joint arbitration board may determine and at a rate of wages (less than the minimum in his trade) they may determine, and the difference between said rate and the minimum scale in his trade should be paid through the joint arbitration board.

The purposes in establishing these schools are to give such instruction in the theory of the carpenters' trade as would supplement practical knowledge, which the apprentices get in their outside trade work.

The number of apprentices enrolled during the year 1911-12 is approximately 400. The subjects taught during the last scheduled year were: English, spelling, American history, applied arithmetic, mechanical drawing, geography, mechanical drawing applicable to bridges and houses, mechanical drawing including house plans, and some geometry, science, manners, morals, and hygiene.

The courses cover three winter sessions of 12 to 13 weeks each year. The schools are in session from 9 a. m. until 12 m. every day from Monday to Friday, inclusive, and from 1 to 3.30 p. m. on Mondays, Wednesdays, and Fridays, and from 1 until 2.30 p. m. on Tuesdays and Fridays.

In the first year there are five 90-minute periods per week devoted to architectural drawing, five to elementary arithmetic, two 150-minute periods each week to plan reading and estimating, one 90-minute period to building construction and building laws, and two 90-minute periods per week for advanced English, spelling and penmanship. In the second and third years there are each week seven 90-minute periods for architectural drawing, five for practical mathematics (by which is meant a combination of arithmetic, geometry and trigonometry), two 150-minute periods for plan reading and estimating, and one for studying building construction and building laws.

The apprentices come under the instruction of tutors who have had, apart from their practical trade experience, teaching experience in cultural subjects.

At the expiration of each term a certificate is issued by the school, which shows the pupil's attendance and class record, including the number of sessions attended, the number of excuses for absences, and the grade attained for each branch taken by the apprentice. Unless such a certificate is presented to the joint arbitration board, and unless when presented it shows satisfactory attendance as well as proficiency, the apprentice does not receive a work card.

As has already been stated, the schools claim only to give the apprentices a start in the technical part of their trade. Usually the ordinary carpenter's practical knowledge of his trade is entirely out of proportion to his theoretical or technical knowledge, and on this account he loses much time and wastes material. The aim of these schools is to correct this condition.

SCHOOL FOR CARRIAGE, WAGON, AND AUTOMOBILE WORKERS, NEW YORK CITY.

This school was established in September, 1909, by the wood workers' branch of the Carriage, Wagon, and Automobile Workers' Union of New York, with 80 students. The school was founded on the belief that a great majority of the workers at the trade would not have an opportunity to learn the details of the craft in the shop or elsewhere, and that a mechanic can never be considered competent without this accomplishment.

The aim of the school is to furnish its members with instruction in the sciences applicable to all branches of the trade.

The entrance requirements for the school are a paid-up card in the Carriage, Wagon, and Automobile Workers' Union and a satisfactory examination as to competency as a craftsman.

The school is a cooperative undertaking between the members of the union who desire instruction and the union. The fee for tuition is \$25 per term of 26 weeks, with an additional fee of \$3 per month.

The course comprises three years of 26 weeks each year. The hours of the sessions are from 9 to 12 every Sunday morning, with evening sessions of one hour during each evening of the week. Attendance at evening sessions is not compulsory, but students are expected to attend if they can do so with profit.

Diplomas are issued on examination to successful students, but a diploma is never granted to a student unless his average attendance has been 75 per cent of the course.

Each student must furnish his own drawing boards, drawing materials, and such other articles as may be necessary.

**DIGEST OF THE UNITED STATES BUREAU OF LABOR REPORT ON
INDUSTRIAL EDUCATION.**

A carefully prepared, exhaustive, and discriminating résumé and analysis of nearly every industrial and trade school in the United States was made by the United States Bureau of Labor during the year 1910.

This report, which was made at the request of the American Federation of Labor, is considered the most comprehensive study of industrial education ever undertaken. Particular attention is given in the report to the courses of study in each school investigated.

The evident purpose of this inquiry by the bureau was to present to the reader the kind of courses which were being offered the youth of the country taking trade courses to fit for industrial occupations.

In the following digest of the report it is the purpose to discuss in brief the most vital points in connection with trade education.

A survey of the schools providing trade instruction which are divided as follows: Philanthropic schools, public schools, and corporation schools, discloses the most interesting fact that the whole number of pupils in the public trade and industrial schools is 14,751, of whom 3,097 are girls; the whole number of pupils in philanthropic schools is 10,694, of whom 3,556 are girls; the whole number of apprentices in railroad corporations and other establishment schools is approximately 5,000, or a total of 30,445 pupils in all the schools.

A most interesting feature in these schools is the differentiation as to the age limit for entrance, for example: The lowest age limit for entrance in the public schools is slightly less than 15 years, the lowest age limit for entrance into philanthropic schools averages 16 years, while the lowest age limit for entrance into apprenticeship schools is approximately 16 years and 6 months.

Apropos of the age of prospective applicants into the trades, it is well to consider the experience of the past five years in these same schools. There has been no rush of especially desirable boys to fill apprenticeship vacancies, and the quality of the boys who do appear is various. Those who succeed in their undertaking are those of good quality, the illiterate fail, and thus it is perfectly clear that the foundation for a trade education must be built on a higher standard of elementary school instruction.

There is a marked tendency in philanthropic schools to shorten the apprenticeship term to considerable less than two years. On the other hand the public schools have gradually increased the course of an apprentice to three years. The term of apprenticeships in corporation schools are almost universally four years.

The following is a list of trades and occupations taught in the schools investigated by the United States Bureau of Labor:

BOYS' TRADES.

Baking, basket making, blacksmithing, boilermaking, bookbinding, brass finishing, bricklaying, brickmaking, broom making, cabinet-making, carpentry, carriage trimming, cement working, cigarmaking, coach carpentering, cobbling, copper and brass working, copper-smithing, die cutting, electrical working, electroplating, engraving,

firemen, forging, gasfitting, glove making, harness making, hot-water fitting, horseshoeing, instrument making—electrical and scientific musical instrument making—jewelry making, ladies' tailoring, lathing, lithographing, machinists, tool making, masonry, mining, molding—core making—optics, painting—house, carriage, sign, fresco, graining—paperhanging, pattern making, plastering, plumbing, pottery, printing—(a) composition, (b) presswork—sheet-metal working—(a) cornice workers, (b) skylight workers—shipwriting, shoemaking, silver plating, silversmithing, stationary engineering, steam engineering—(a) gas, (b) gasoline—steamfitting, stone carving, tailoring, tile setting, tinsmithing, upholstering, watchmaking, wheel-writing, wood carving, wood turning, woodworking.

GIRLS' TRADES.

Millinery, elementary millinery, advanced millinery, millinery design, artificial flower making; dressmaking, elementary dressmaking, advanced dressmaking, designing, garment cutting, hand sewing, machine sewing, ladies' underwear making, ladies' tailoring, embroidering; power machine operating, foot machine operating, garment making, children's garment making, shirtwaist making, skirt making, tailoring; household arts and science.

BRANCHES OF THE TEXTILE TRADES.

Brushing, burling and mending, carbonizing, carding, combing, designing, drawing-in, dyeing, dusting, gilling, knitting, loom fixing, mule spinning, napping, picking, pressing, ring spinning, scouring, shearing, singeing, sorting, speck dyeing, spooling, steaming, twisting, warping, washing, weaving.

PUBLIC TRADE SCHOOLS.

INTRODUCTION.

Assuming that trade education is to become an integral part of our public school education; assuming also that it is to be the most expensive kind of education offered in our public school systems, there are several very important questions that must soon be settled, for effort to engraft upon public education comprehensive schemes of trade training must receive a serious handicap, for example, the following questions must soon receive serious consideration:

1. From what source or through what methods shall adequately trained teachers be developed?
2. What disposition is to be made of the product of trade schools?
3. How are the pupils to be retained in trade schools during the full number of years in the courses?
4. What is the actual money value of trade training?

The first question has been discussed at length elsewhere, which brings us to the question as to what disposition shall be made of the product of public trade schools. This promises to become a serious problem. That there is much interest shown by the administrators of these schools to get pupils almost immediately to a productive

basis, and an even stronger desire to develop the productive side of the school, can not be denied.

It has been pointed out that almost any municipality has an opportunity through its numerous department activities to develop its own trade-school pupils. The suggestion has been made that by applying the practical knowledge of the pupils to productive work in mechanical, electrical, wood working, printing, and the various other departmental activities, considerable noncompetitive experience could be gained. This method would result in a distinct advantage to both pupil and city, as well as to lessen the disadvantage of placing the pupils in direct competition with journeymen.

It is to be regretted that there is apparently so little satisfaction in producing for the municipality, the directors of these schools being especially interested in measuring the productive side of the prospective applicant to the skilled trades with that of the outside world.

This attitude on the part of public-school administrators is the cause of another and perhaps more serious contention, one which may finally prove more disastrous to these schools than the making of a product in competition with the outside world—that is, the inability to retain pupils throughout their full term.

Apropos of this question, an examination of the records of public trade schools discloses the startling information that a very considerably less than 40 per cent of those entering finish a full term. It is particularly noticeable in the Milwaukee Trade School, where the records show that only 20 per cent of those entering finish the full term. Even in the much-discussed Newark (N. J.) Technical School, which, however, is not a trade school in any sense, but which places so much emphasis on "training for efficiency" and "the money value of industrial training," only 10 per cent of those entering finish the full term.

This would seem to be an argument for raising the compulsory school age, as well as placing more emphasis on theory and shop practice during the first two years of a trade course, leaving speed and skill to be developed during the two latter years.

If we are to judge the value of trade training by the average weekly earnings, as reported of a great number of recent graduates of public trade schools, then it is eminently fair to consider these schools failures, but inasmuch as all the publicly administered trade schools are still in their experimental stage; that their teachers in comparison with other public-school teachers are inefficient, judgment should be suspended. Moreover, if three or four years of trade-school training promises for graduates of such schools only 50 per cent of the prevailing wage in specific trades, then there is much that is undesirable in the present development of such schools.

Nothing is so unjustifiable in the training of the youth of the country for trades as an attempt on the part of school authorities to get the pupils into wage-earning occupations as soon as the pupil develops a wage-earning capacity. Indeed, nothing could be done to better demonstrate the intent of those in charge of such schools to flood the market with only partially trained mechanics than to develop wage-earning capacity in trade-school pupils during the first two years of their courses and then permit them to be exploited by unscrupulous employers.

MILWAUKEE SCHOOL OF TRADES, MILWAUKEE, WIS.

By an act of the State legislature, the Milwaukee School of Trades, which was founded on January 2, 1906, by a number of philanthropic men interested in industrial education, and under the auspices of the Merchants' and Manufacturers' Association, of Milwaukee, was taken into the public-school system of this city on July 1, 1907, the date the act became effective.

The Milwaukee School of Trades is maintained for the purpose of instructing young men in the practice and fundamental principles of the manufacturing and building trades.

The school does not claim to turn out journeymen mechanics. Its aim is to instruct its students thoroughly, in as short a time as possible, in all the fundamental principles and in the practice of the trade in question, so that they may, upon graduation, possess ability and confidence, and be of immediate practical value to their employers and receive a fair remuneration at once. Students who complete their course and receive their diploma should be at least on a par with the apprentice who has served four years under actual manufacturing conditions. Speed and efficiency as journeymen should very soon follow.

The school is under the immediate supervision of an advisory committee of the board of school directors, as provided in the legislative act. This committee is called "The committee on trade schools."

The school is maintained by the assessment of a special tax, not exceeding one-half mill, for the purpose of industrial education.

The trades offered are pattern making, machinist, and tool making, carpentry and wood working, plumbing and gas fitting. The length of the course in each trade consists of 2 years of 52 weeks per year and 44 hours per week, with the exception of the plumbing trade, which requires but one-half of the above time. School closes for legal holidays only. It is the aim of the school to place the student in conditions as nearly as possible like those he will meet in actual practice. School hours are from 8 to 12 and from 1 to 5 daily except Saturday. Saturday session 8 to 12. Evening classes 7.30 to 9.30, on Monday, Tuesday, Thursday, and Friday nights of each week from October 1 to April 30.

The course of instruction in each trade includes the following five branches:

1. Shop practice and trade lectures.
2. Drawing: Mechanical drawing (isometric, working drawings, problems in design, architectural); freehand working drawing.
3. Workshop mathematics (shop arithmetic, shop algebra, shop geometry, shop trigonometry).
4. Shop inspection trips (in connection with each trip a carefully written report must be submitted).
5. Practical talks and lectures on subjects connected with each trade and topics fundamental to all trades.

Approximately one-fourth of the student's time during his course is devoted to academic instruction incidental to his trade and vitally essential to the first-class artisan whom the world needs and the

school is endeavoring to develop; the remaining three-fourths being spent in actual shop practice.

A special feature of all the classroom work consists in adapting it as nearly as possible to the special requirements of the various trades. For instance, a different class of instruction is given in mechanical drawing and work-shop mathematics for each trade.

A good working knowledge of elementary mathematics is highly essential to the successful mechanic and foreman, and a good course in this subject is given. While it is conceded that many other branches would prove of value to the students, it has not been deemed advisable to introduce them into the actual work of the school, but the students are urged to supplement their practical work by as much outside reading and study as possible. Home work is required of all students. They are urged to subscribe for some good trade journal along the lines of their chosen trade and keep in close touch with the latest and best methods of trade practice. It is not the purpose of the school that its graduates shall be merely skilled artisans; it is intended that they shall be not only trained and efficient, but intelligent workmen, desirous of making the most out of themselves in their chosen vocation from its every point of view.

It is also the aim of the school to secure instructors who are specialists in their line, men who are interested in the work, and who can impart their knowledge and experience to apprentices.

The class of work given to the students is carefully planned to be as nearly as possible of equal educational and practical value. Thus the student's interest is aroused and held. A high standard of workmanship is demanded from every student, and only those attaining it are permitted to graduate.

The night classes are planned principally to supplement the experience of apprentices and workmen who are employed during the day at the trade in which they desire advancement under night instruction. The total day instruction of the two-year courses requires 4,464 hours. The total night instruction of one term of 31 weeks at 8 hours per week amounts to 248 hours. Thus it is evident that none but students of exceptional ability and determination could expect to serve the entire school apprenticeship in night classes only. The school does not advise students to attempt to learn a trade by this means.

Students must supply their own drawing instruments and all drawing material, and are requested not to purchase them until properly advised by their instructor.

In order to qualify for admission, students must be 16 years of age and be able to read and write in English and perform the fundamental operations of arithmetic. Eighth-grade graduates are admitted without examination and are given preference over applicants who have not had such preparation. Since it is required by law that a pupil be at least 16 years of age in order to be admitted, it is urged upon all boys desirous of entering that they take advantage of every opportunity offered by the public school system up to the age when they are eligible for admission to this school.

Boys who desire to attend the trade school, but who are below the age at which they may enter, will be allowed to pursue in the high schools, until they reach the trade school age, those studies which will be of most help to them in their future work in this school.

The cost of maintaining this school is approximately \$225 per year for each pupil. Thus in two years a boy receives an education costing from \$400 to \$500.

The school grants a diploma to each student completing the prescribed course in a satisfactory manner and passing the final examination.

Any student who completes his apprenticeship, as outlined in the regular course, in less than the scheduled time for his trade, may graduate and receive his diploma as soon as he passes all the requirements incidental to that trade in a satisfactory manner.

The school does not guarantee positions to its graduates. It has, however, many applications for them, and those attaining the best records, in point of application and ability, will be recommended for the best positions. It is not the policy of the school to recommend apprentices before they have successfully completed their course.

PHILADELPHIA TRADES SCHOOL.

As the result of an effort upon the part of the Master Builders' Exchange to establish a trades school in Philadelphia, there was opened in 1906 one of the first trades schools in the United States as an integral part of the public school system.

The aim of the Philadelphia Trades School is the development of intelligent workingmen, and to this end an effort is made to stimulate an interest in and dignify the calling to which its pupils will go. The school does not aim to prepare its pupils for college and therefore does not in any way lap the usefulness of the present high or manual training high schools. The term is three years in length. The school is in session five days in the week from 9 a. m. to 3.30 p. m., with an intermission of 30 minutes at noon for lunch. The school year is coincident with that of the other public schools in Philadelphia. The following trades are taught in the day school: Architectural drafting, mechanical drafting, carpentry, pattern making, printing, and electrical construction. Of the 30 school hours in the week the time is equally divided between shop work and the study of English, mathematics, physics, chemistry, and drawing as they are related to trade work. In all the academic work an effort is made to present actual shop problems and trade literature.

In English the course is similar to that of high schools in that its aim is to teach the proper expression of thought. It differs from high school English in that its work relates to technical subjects rather than to purely literary ones. In the second and third years instruction is given in business correspondence, the preparation of proposals, bids, specifications, contracts, etc. Economics, industrial history, and commercial law are taught with an entirely practical aim. In mathematics, at the beginning of the school work, there is a general review of grammar-school arithmetic and in a short time algebra is taken up. In the second and third years geometry, trigonometry and book-keeping are taught. A constant effort is made to present practical problems in all of the work in mathematics.

In the drawing room the work is in keeping with the trade being studied. Drawing being the language of a mechanic, it is essential that every intelligent workingman be able to draw plans for his work and to read plans which have been prepared by some one else. At

the beginning of the course every student, no matter what his trade, completes a series of elementary exercises in drawing. This work is completed in about five months and after that time the drawing in the different trades is special. For example: Carpenters make drawings of the different wood joints and advance to house plans. Electricians make plans for switchboards, house wiring, dynamo and motor installation. Excepting in the trades of architectural and mechanical drafting, the aim of the course in drawing is not to turn out skilled draftsmen.

The instructors in all the trades are journeymen mechanics in their separate trades. The teachers of drawing, physics, and theory of electricity are practical men, while the teachers of English and mathematics are college-bred men who have specialized in the branches which they teach.

The school is supported entirely from the regular school budget and is under the supervision of a principal who is appointed by the board of public education and is responsible directly to the superintendent of schools.

There is no advisory board or committee of business men as is the case in some cities.

None of the product of the school is sold, but it is the aim to have as much of the work as possible be on something of practical value.

Work is therefore done in all of the departments not only for our own school, but also for other schools under the direction of the board of the public education. It is thought that the more nearly the trades schools can become the workshops for the boards of public education, the more nearly they will realize their ideal, arranging the exercises so that no pupil shall have more nor less than sufficient repetition and keeping always in mind the fact that the boy and not the output of the shops is the aim of the schools.

The per capita cost of running the school last year with an average enrollment of 186 and an average attendance of 161 was \$90 58. The first class, 24 in number, was graduated from the Philadelphia Trades School in June, 1909. These young men, except three who are studying at the University of Pennsylvania and Drexel Institute, are now working at the trades which they studied in the school and are earning an average weekly wage of \$10.

In June, 1910, the second class, 28 in number, was graduated. Except two, who are temporarily out of employment, and two who are carrying on higher studies, these young men are working at an average weekly wage of \$8 50.

Owing, perhaps, primarily, to the general impression that hand work is degrading, one of the first difficulties presenting itself in the organization of the Philadelphia Trades School was that of gathering a student body. This was not a new problem as it was present when manual training was introduced in a special school. Nor is it to be wondered at now, when one considers the fact that all the teachers in the elementary schools have been trained to feel that a professional career is the acme of success in a boy's life. However, as the work and purpose of the trades school have become known, applications for admission have increased in number until now the building is filled to its capacity and another abandoned school building has been transferred as an annex to the trades school.

WISCONSIN STATE MINING TRADE SCHOOL, PLATTEVILLE, WIS.

The specific purpose of the Wisconsin State Mining Trade School is "to meet the need for well-trained, practical men to operate the mines of the State successfully and economically." The initial steps for establishing this school were taken by the mining men of the Wisconsin lead and zinc district, under authority of an act of the State legislature passed in 1907. Actual work began January 27, 1908. The school receives its support from funds appropriated by the State legislature and from fees paid by nonresident students. The subjects to be taught are regulated by the act establishing the school, of which the following is a part:

SECTION 392q. The course of instruction shall be two years in length, and shall embrace geology, mineralogy, chemistry, assaying, mining and mining surveying, and such other branches of practical and theoretical knowledge as will, in the opinion of the school board, conduce to the end of enabling such students of said school to obtain a knowledge of the science, art, and practice of mining and the application of machinery thereto. The dean of the college of engineering of the University of Wisconsin shall be consulted concerning the course of study, and the same and all modifications thereof shall be approved by him.

This school bears no relation to any other school. It is under the control and management of a board of three members, one of whom is the State superintendent of education and the remaining two are residents of the Wisconsin lead district, appointed by the governor of the State. In June, 1910, there were 23 students enrolled in the mining classes. Graduates from the eighth grade of a city school or pupils who have a diploma from a country school are admitted without examination. Other candidates for entrance must pass an examination in arithmetic and English. There is no regulation as to age limit, and pupils may enter the school at any time during the school year. There is no arrangement with the local mining companies for giving employment to the pupils while attending school, but students frequently work Saturdays and Sundays in the lead and zinc mines.

The subjects taught during the two years' course are: Physics, advanced arithmetic, plane geometry, solid geometry, algebra, plane trigonometry, chemistry, mining machinery, mining methods, mining economics, elementary mechanics, surveying, mechanics of materials, metallurgy, general geology, mining geology, hygiene, and first aid.

The school year is divided into two terms of about 18 weeks each. In the first year of the course a total of 24 hours per week on an average is devoted to theory, including time spent in study in school and 16 hours per week to practice work. In the second year 23 hours per week are devoted to schoolroom work and 17 hours per week to practice work. During each winter a course of evening lectures covering 20 hours is given on mining metallurgy and allied subjects. All students are required to attend these lectures and take notes.

Instruction is given from 8 a. m. to 12 m. and 1 to 5 p. m. daily, from Monday to Friday, inclusive. The length of the school year is 38 weeks, the school opening September 7 and closing June 10. There is no summer term, but the pupils are expected to spend the summer vacation between the first and second school year working in some branch of the mining industry.

The practice work is of a practical nature and is carried on in the basement of the school building, which is fitted up as a miniature

mine, having all the machines, tools, and appurtenances of a mine in operation.

The school has a mineralogical museum, which is primarily a working collection of all the common varieties of minerals and rocks for student use. In addition, many fine exhibition specimens have been secured and special attention will be devoted to making a collection of the various crystals found in southwestern Wisconsin. The collection of lead and zinc ores from Wisconsin, Iowa, and Illinois, belonging to the Tri-State Mining Association, has recently been secured for the use of the school.

The school has seven teachers, secured either from scientific schools or from the mining industry. These teachers are responsible to the Wisconsin Mining Trade School board. There has been no difficulty in retaining teachers qualified to teach mining.

No tuition fee is charged to residents of the State of Wisconsin. Nonresidents must pay \$50 per year tuition fees. All students are required to pay \$20 per year for materials and also to deposit \$5 on entrance to cover cost of breakage or damage to apparatus. The students are required to furnish their own text and note books, drafting instruments, etc., and a charge of \$2 for a diploma is made on graduation. The cost of materials used in shop practice during 1909-10 was approximately \$500. No marketable product is made by the school.

WORCESTER TRADE SCHOOL.

The Worcester Boys' Trade School was established in December, 1908, under State and city ordinances, providing for independent industrial schools, and opened to pupils February 8, 1910. It is in charge of a board of trustees of nine members elected by the city council, three trustees being chosen annually for a term of three years.

The school is intended for boys whose tendencies are toward active manual work rather than toward bookwork. It is not in any sense a preparatory school for higher institutions of learning, but opens out into the large field of mechanical activity.

The aim of the school is to give a training equal to that of the shop apprenticeship and in addition to impart technical knowledge directly related to the trade taught. Beyond this it is also the aim of the school to give its pupils the most essential parts of a high-school education, so far as English, history, civics, drawing, science, and mathematics are concerned.

Boys wishing to enter must have passed their fourteenth birthday. It is desirable that pupils should have completed the work of the grammar grades in the public schools, but other boys showing a distinct aptitude for the work may be admitted.

Instruction is offered in these trades: Machine work, toolmaking, carpenter work, cabinetmaking, pattern making, and power-plant engineering. At present there are 166 pupils in the above classes.

Instruction is given, so far as possible, in groups. The classes, however, are small as compared with those of the ordinary school. Practice is entirely individual and no pupil is held back by his fellows, nor is he unduly hurried to keep up with others.

In general, practice is directly upon commercial work. Exercises of no commercial value are used in such cases as may be found nec-

essary to prevent excessive waste of valuable material. No exercise work is used under any circumstances where the objective point of its commercial application is not constantly before the pupil.

Alternate weeks are spent by each pupil in commercial shopwork and in study and recitation. During the recitation week another period of 10 hours is spent in what is known as shop instruction. This work is carried on in a section of the shop and consists of various methods of correlating the work of the commercial shop and the class room. In this department the younger boys are taught shop methods as far as possible in advance of coming in contact with them in the shop. They are taught handwork, filing and scraping iron, and the making of various joints in woodwork. Later they are taught to lay out work and to use various measuring instruments and to plan work for the shop. All work going into the shop passes through the shop instruction rooms, where it is "routed" by the pupils, subject, of course, to the approval of the instructor, so that its progress through the shop can be expedited and that no questions can arise later as to the order of operations. Still later these same boys make estimates and compute cost from the time cards on each job.

To briefly review these studies it may be said that "shop computations, formulas, geometry, and study of triangles" comprise work in the application of only a few very simple mathematical processes to actual shop conditions. The work is very largely drill in practical problems, several thousand such problems having already been gathered. Commercial arithmetic and commercial geography deal with the transportation, purchase, and sale of materials and products. The study of geography is made directly from waybills loaned by the railroads.

Natural science deals with the problems in mechanics, hydraulics, and electricity with which the workman in a shop may expect to come in contact.

The cultural side of the boys' education is provided for in the work in English, history of commerce and invention, and good citizenship, though even in these subjects use is made of the practical application of each study so far as possible. In English, shop reports are made of each week's shopwork which are criticized by a shopman, and a portion of their reading is taken from the technical papers of their trade. The history of commerce and invention is directed largely toward the rousing of the ambition of the young man by showing him the successes that have been made in the past by shop-trained men. Good citizenship is based largely on the experiences of the boy in the shop, and is made to grow out into the relations of the shop to the economics and government of the outside world.

Drawing is taught from the start by the methods prevailing in drafting rooms and is intended to give the pupil, not skill as a draftsman, but facility in sketching and in reading drawings. Drawings for use in the shop are made in the drafting room by pupils who are either scheduled for shopwork or shop instruction. It is intended that drawings shall be made by one boy, checked by another, and used by others, in order that their inaccuracies may be brought forcibly to the attention of the draftsman.

The daily sessions of the school are from 8 till 12 and 1 to 5, except Saturday afternoon. All legal holidays are observed. The only regular vacation is the four weeks preceding Labor Day. During the

shop week pupils who have had no lost time or demerits during the preceding two weeks are excused from attendance on Saturday morning. All courses cover a period of four years.

The school is supported by appropriation made by the city council and also by reimbursement by the State on approval by the State board of education to the extent of one-half the cost of maintenance.

COLUMBUS TRADE SCHOOL.

The Columbus Trade School was established by the board of education to give boys who desire it a thorough training in one or more of the several mechanical trades, together with such academic subjects as will have a helpful bearing on the trade selected, or will help make them more intelligent and useful citizens.

A modified form of the "co-operative" plan in successful use in other places will be followed. Briefly, this plan is to divide the course into two parts—preparatory and cooperative. Boys who have finished the eighth grade will take one year of preparatory work; boys who have finished the sixth grade and are 14 years of age may be admitted to the school and take two years preparatory work. This preparatory work will consist of mechanical drawing, arithmetic, and shop work in wood and metal. The aim being to give the boy the preliminary training necessary to take hold of shop work to advantage; also to become somewhat familiar with the mechanical field, and so make an intelligent choice of the work he is to follow. This choice is an important step in the life of the boy and should be made with care. Records of the work and the characteristics of each boy will be kept, in order that any member of the faculty may better advise or suggest to the boy the line of work he is best fitted for. It is hoped that in this way an intelligent choice may be made, rather than leave it to chance, as is so often the case in life.

At the end of the one or two year preparatory course the boy will be expected to select the trade he wishes to follow. Boys who have shown that they are fitted to become good mechanics will be recommended to some of the leading local manufacturers as cooperative apprentices. They will enter into an apprentice contract with the manufacturer, in which they agree to spend alternate weeks in the trade school and in the shop of the manufacturer for three years. During the summer vacations the boys will work in the shop full time, except for a vacation of two weeks.

For the time spent in the shop of the manufacturer, the boy will receive regular apprentice wages. After the three years of cooperative work the boy is to spend one year on full time in the shop to get the experience without which no man is qualified to be considered a thorough mechanic.

Those who finish the course will have received the equivalent (to them) of a high-school education, a thorough training in the trade selected, and will have earned during the time about \$950. It is hoped that the manufacturers will offer in addition a bonus of \$100 to those who successfully complete the course.

It is practically certain that a boy who completes this course will be sure of a good position, though of course the trade school can not guarantee a position. Manufacturers are looking for intelligent, independent, thorough mechanics.

It must be understood that the boy must show ability along mechanical lines and an inclination to make good use of his opportunities before the trade-school faculty will recommend him to a manufacturer for an apprenticeship.

The wages proposed, though not formally adopted for the cooperative work as yet, are as follows: First year, 10 cents per hour; second year, 11 cents per hour; third year, $12\frac{1}{2}$ cents per hour; fourth year (first six months), 14 cents per hour; fourth year (second six months), 15 cents per hour. At above rates the boy will be able to earn the following total amounts (this includes 10 weeks full time during each summer):

First year.....	\$165.00
Second year.....	181.50
Third year.....	206.25
Fourth year.....	398.75

Total..... 951.50

This opportunity to secure a thorough training in one of the mechanical trades, get a good education in such a form as to be able to use it, and at the same time earn enough for expenses (particularly if the boy can live at home), is a chance that should be attractive to many boys.

The courses offered at present are carpentry, pattern work, cabinet work, machine work, electrical work, and printing. It is expected that other lines of work will be added as the demand grows.

The work in the printing department will for the present be given wholly in the school. The commercial printing offices are so highly specialized that it is difficult to arrange cooperative work that will give the boys the desired training necessary for successful printers. It is hoped that some work on the cooperative plan may be arranged later.

COOPERATIVE COURSE.

Alternate weeks in school and commercial shop.

	Periods per week.
First year:	
English.....	3
Civics.....	2
Drawing.....	10
Physics.....	3
Physics laboratory.....	4
Shop mathematics, including elementary algebra.....	5
Reading mechanical papers.....	2
Coordinator.....	1
Study in school.....	5
Total.....	35
Second year:	
English.....	2
History and geography.....	3
Drawing.....	6
Physics.....	2
Physics laboratory.....	6
Mathematics.....	4
Mechanisms.....	3
Commercial geography.....	2
Reading mechanical papers.....	1
Coordinator.....	1
Study in school.....	5
Total.....	35

	Periods per week.
Third year:	
English.....	3
Industrial history.....	2
Drawing.....	6
Physics.....	2
Physical laboratory.....	6
Mathematics.....	4
Estimates and shop systems.....	3
Mechanics.....	2
Reading mechanical papers.....	1
Coordinator.....	1
Study in school.....	5
Total.....	35

Fourth year:

Full time in commercial shop as fourth-year apprentice.

MECHANICAL AND ELECTRICAL SUBJECTS.

Coordinator.—The coordinator is a man from the school who visits the shop where the boy is at work, sees the problems the boy meets, and how the work he is doing fits into the whole plan of production. When the boy returns to the school the coordinator goes over the shopwork with him and explains any points that are not clear. The best way of solving the problems and the reason for the methods used are discussed. It is the duty of the coordinator to fit the school work to that of the shop and unite the two into a complete whole. The coordinator must take a personal interest in each boy and see that he gets proper work in school and shop; advise, encourage, and direct the boy in all his work. The coordinator does not interfere in the management of the shop or the methods of work. The boy, while in the shop, is under the shop management the same as any other employee.

Mathematics.—The elementary processes will be reviewed with the object of making sure that the pupil can use them in the solution of such problems as are common in mechanical work. Such branches of mathematics as may be used in the practice of the various trades are taken up and taught by the solution of problems selected from practical work. The aim is to make mathematics a tool that can be used.

Drawing.—Drawing is the language by which mechanical ideas are expressed. A workman who can not read and understand drawings is at a great disadvantage, and his chance for advancement is small. One who is going to make a success in mechanical work must understand the language. The instruction includes free-hand sketching, elementary mechanical drawing, projections, working drawings, architectural drawings of plans, elevations, and details of construction; tracing and blue printing. The work will be varied to suit the lines of work selected by the pupil.

Carpentry.—This work will be planned to prepare the pupil to use the tools and methods in use by the best builders. The shop work is intended to teach the pupil to do careful, accurate work from drawings, and how to use the ordinary carpenter's tools. The use of the steel square is given a good deal of attention. Joinery, framing, outside and inside finishing are taken up in the shop and classroom.

Cabinet work.—This is preceded by practice work in joinery and the proper use of tools. The work consists of furniture building and finishing. Selection of designs, choice of wood, rigid construction, finishing, and polishing are some of the points emphasized.

Pattern work.—This work requires care, accuracy, and a knowledge of foundry and machine-shop methods. The fundamental principles are taught by examples. Draft, parting, shrinkage, contraction strains, allowance for finish, core prints, core boxes, finish of patterns, and methods of construction to best stand the rough handling in the foundry are subjects which are taken up in shop and classroom.

Wood turning.—This work is taken up as a part of pattern work, and in connection with some of the cabinet work. Wood turning as a trade is not encouraged, because of its narrow field and limited demand.

Metal work.—This course is to prepare a pupil to take up the work of a machinist in a commercial shop. Care and proper use of the standard hand and machine tools, proper grinding of cutting tools, planning the best way to do different kinds of work, difference in the working of different metals, proper mounting of work in machines, accurate caliper, finishing, and polishing are all emphasized. The various branches of metal work form one of the large fields for mechanical workers; the field is growing.

Electrical work.—This work is based on mathematics, physics, and drawing. The first year is therefore given up to these subjects and shop work. Calculation and installation of wire; selection, installation, care, and operation of electrical machinery; location of trouble and its repair; estimates, contracts, and specifications are some of the subjects taken up. Electric lighting and telephones are studied by those wanting to take these lines.

Printing.—Because of the highly specialized organization of the modern printing office, the thorough printer is becoming scarce. The demand for good printers is growing. The thorough printer requires a wider range of information than some other craftsmen. Words are his tools, and their use is his business; for this reason, spelling, etymology, grammar, rhetoric, and literature are the subjects that are given particular attention. Correct performance of the fundamental operations is insisted on. In the matter of plain composition the pupil is thoroughly grounded; and from this in logical order are taken up tone, shape, and type harmony, and grouping of masses in display composition; harmony of colors, and imposition. In display work the aim is to teach accepted principles of typography, rather than simply practice the composition of selected specimens. But in the application of these principles, which the boy must make for himself, ample practice is afforded in the composition of the common commercial forms.

ACADEMIC WORK.

The various lines of academic work listed in the course of study are so taught as to be of direct benefit to the pupil in his after work, and to make him an intelligent, useful citizen.

HOURS OF SCHOOL WORK.

Preparatory, 8.30 a. m. to 11.45 a. m., and 12.45 p. m. to 2.30 p. m.
Cooperative, 9.30 a. m. to 11.45 a. m., and 12.45 p. m. to 3.20 p. m.

STATE TRADE SCHOOL, BRIDGEPORT, CONN.

The Connecticut plan differs greatly from any that is followed by her sister States in the matter of industrial education.¹

In 1909 the State legislature passed a law appropriating \$100,000 for the establishment and maintenance of two trade schools for two years. The purpose is to train all-round mechanics and to replace the apprenticeship system which has already declined. The matter was taken up with the various cities and subscription raised. One of the schools was located in Bridgeport and one in New Britain, both large manufacturing centers. The subscription, something about \$10,000 in each city, was used to defray the expense of repairs, and the initial cost of equipment.

The idea was to establish two experimental stations maintained by the State in which a solution of the problem could be worked out for the various other cities.

The school at Bridgeport was opened September 1910, and the one at New Britain two months earlier. The instruction in each is practically the same.

The "ideal" in Bridgeport is to reproduce so far as possible the actual factory conditions and it was with this end in view that the general organization was decided upon. The only entrance requirements are that a student be fourteen years of age. All the teachers must be fully trained and skilled mechanics. The hours are from 8 a. m. to 6 p. m., and all work instead of being based on models and exercises consists of actual commercial work taken from factories. The idea of this was to make it necessary for the students to maintain actual trade standards of workmanship.

Every kind of opportunity is offered in this school system. The departments consist of day school, continuation school, half-time school, vacation school, and evening school.

Day school operates 9 hours a day, $5\frac{1}{2}$ days a week, 52 weeks a year, allowing each teacher and each student two weeks' vacation. Six and one-half hours a day are given to actual shopwork in the trade pursuit selected and $2\frac{1}{2}$ hours to academic training.

Students may enter school any day in the year and may leave at any time. Graduation depends upon, for the boys, the successful completion of four thousand eight hundred 60-minute hours of instruction, and for the girls three thousand six hundred.

Courses are offered in the trades of carpentry, cabinetmaking, pattern making, machine-shop practice, tool making, die making, drafting, and printing.

The foreman in charge of each department is the general instructor in the school unit. The carpenter teaches the shopwork, drafting, and mathematics and gives the daily shop lecture connected with his department, and so with the other trades.

Academic work consists of drafting, trade mathematics, shop lectures, applied science, and mechanics.

In all, however, the aim is to actually reproduce trade conditions. This is done in various ways. The boys' schools are located in actual factory buildings.

¹This school is at present undergoing a searching inquiry as to courses and methods of instruction by educators, trade unionists, and the public.

The printing department does a great part of the State work and some jobbing work; the machine department makes machines for the market orders and jigs and fixtures for factories; the pattern department provides the machine department with necessary patterns, and also takes in outside orders, while the carpentry department has almost completed the building of a \$5,500 house for a local contractor.

Methods employed in all of the school's practical work are as follows:

A job is taken and figured upon in the terms of a journeyman's time of production and estimated at the regular journeyman rating on that line of work. It is then made by the students, who have to take account of the cost of material, labor, and overhead. In this way they get the actual trade contract and appreciation for production.

Then, on the other hand, each trade is fully analyzed on a basis of the operations involved and the student's record checked so as to insure his broad training.

Regular job tickets and cards are kept in each department on all work and turned into the office as regular records of jobs. On each time ticket estimates are given and the student's efficiency rating may be found. If he meets his estimate a bonus of 10 per cent on his time is given him and applied on his course.

As he approaches graduation his time is estimated on a journeyman basis gradually, so that his journeyman rating of efficiency may be found accurately in terms of percentage.

The continuation school consists of courses offered to apprentices in the trade. They spend four hours a week at the school receiving instruction in mathematics and drafting related to their trade. The teacher then follows them up in the factory, so as to better relate their instruction to their needs.

The half-time course may be entered on the completion of the first year's training. The student may enter the actual trade in a factory and work one week, attending school the alternate week. He is paired off with a "running mate" who alternates weekly with him. While in the factory the student is a regular apprentice, and while in school he is a regular day student. While at work he is still under the supervision of the school, and his trade work is open to the advisory direction of the department.

Vacation courses are offered during July and August and are open to regular city-school students of 12 years or over.

Evening school is in operation six nights a week, forty weeks a year. This course is open to any person who is employed, and the special individual needs of each student are provided for.

In the entire work, however, it has been impossible to provide commensurately for the demand. During the past winter there were 450 on the waiting list, while it was impossible to in any way meet the demand for the vacation school even operating on half-time alternating basis.

Following is a report of the actual plant cost of operating the Bridgeport school, which is of great value in showing the earnings as applied to the expenditures:

THE YONKERS TRADE SCHOOL.

The Yonkers Trade School, which is a publicly administered trade school, was made possible by a gift from the late Ervin Saunders, of Yonkers, N. Y., and was established in January, 1910. The gift includes the buildings and equipment of all the trade-school shops.

The school is a part of the public-school system of Yonkers. Its principals and instructors are employed by the board of education, and its courses are free of charge to all residents of the city of Yonkers. Nonresidents are charged a tuition fee of \$75 per year.

The requirements for admission are the same as now prevailing under the New York State law for obtaining a "work certificate," that the applicant shall be at least 14 years of age and shall have completed the requisite number of hours or the equivalent of such in the grade work of the elementary schools. While theoretically the trade department is open to boys 14 years of age, in practice very few boys under 16 are enrolled.

To insure the pupil's efficiency in the shop and proficiency in the class, the school is open from 8.30 a. m. until 3.30 p. m. A minimum of 1,200 hours constitutes the year's work. An attendance of two years, or 2,400 hours, is the requisite for the granting of the certificate issued by the State board of education.

Pupils are placed in classes according to their choice of a trade, and the major portion of their time is devoted to shop work.

The academic curriculum is made an adjunct of the shop work and is so arranged that individual instruction is possible; furthermore, each class is grouped in such a manner that no pupil is required to repeat work which he has satisfactorily completed in any other school, whether of grammar or high-school grade.

In addition to shop work, drawing, and mathematics, each pupil is required to undertake academic work in the following subjects: Commercial and industrial geography, United States history and civics, business correspondence, public and personal hygiene, English, including a study of trade and technical literature.

The Yonkers School, unlike other trade schools, has a vocational department. This vocational department covers two years of study and is intended to give pupils an opportunity to discover their aptitude for trade education. The last two years are spent in the trade-school department, where an intense study of trades along definite lines are made, the purpose of which is to give the pupil two years of training, which will fit him to go at once into gainful occupation.

All the teachers are practical tradesmen and are required to take a normal course under the direction of the principal of the training school for teachers.

The trades taught are pattern making, plumbing, carpentry, cabinetmaking, steam engineering, electrical work, printing, machine-shop practice, which includes architectural drawing and mechanical drawing.

The total number of pupils enrolled during the years 1911-1912 was 161; total number of teachers, 8.

COOPERATIVE SCHOOLS.

The purpose of this discussion is to outline the present status of what is becoming generally considered the most practical plan for instruction in the trades, or, in other words, cooperative part-time schools.

While cooperative schools differ materially in their operations, inasmuch as their cooperation is effected in various ways, the purpose remains the same. Almost every locality having a scheme of cooperative education has planned it to meet the needs of that particular locality. These schools are conducted for the instruction of apprentices under an agreement, usually between the public schools and the employing establishments, the latter usually making it mandatory on the part of apprentices to attend such schools.

COOPERATIVE HALF-TIME SCHOOLS.

While cooperative schools differ materially in their operations, one group is quite distinct. This is the half-time school, in which the pupil is in the school half the time and in the employer's shop the other half. The other schools—part-time schools—provide for only short periods of instruction each day or week, or provide instruction for a stated number of weeks in the year; all, however, under a cooperative arrangement.

The most popular scheme for cooperative half-time schools is one in which the apprentices spend alternate weeks in the school and in the shop, one boy being in the school while the other is in the shop. This plan requires two boys to each job. In this alternating system the school work is closely correlated with that of the shop and comprehends more or less cultural work, such as industrial geography, industrial history, chemistry of materials, shop physics, civics, shop and business English.

It is becoming common practice in many of these schools to defer the shop work until the beginning of the second year of the boy's apprenticeship, all of the first year being devoted to school work, while the other two, three, or four years are devoted to the half-time plan.

Another most interesting, as well as invaluable, scheme in connection with the cooperative half-time school is the introduction of the "shop coordinator," whose functions are to coordinate the practice in the shop with the instruction in the school by teaching the apprentices one week in the school and the next week in the shop, the theory being that the "shop coordinators" must be practical men, understanding thoroughly the practical as well as the theoretical side of the trade.

Since all of the cooperative half-time schools throughout the country are of such recent origin, and in view of the fact that none of the schools giving a four-years' course has yet graduated apprentices from its full course, it is extremely difficult to describe the many actual advantages of cooperative schools.

It is generally conceded by the advocates, supporters, and directors of this plan of education that the rapidity with which apprentices have developed under it shows marked advantages over the old-time method of apprenticeships.

BEVERLY COOPERATIVE SCHOOL.

Probably the most noteworthy example of the cooperative half-time plan is the Beverly-United Shoe Machinery Co. School. This school was started in September, 1909, and at present has 61 apprentices. It differs from almost every other school of a cooperative nature inasmuch as all the apprentices are employed by the United Shoe Machinery Co., of Beverly, Mass. Nearly all of the other cooperative schools have apprentices in several of the employing establishments in the localities where the schools have been established.

The aim of the Beverly school is to give elementary instruction in the machinist trade to any boy who can qualify for entrance; that is, boys having completed the sixth-grade school work. During the year the public-school side of this cooperative plan purposes to give the boy theoretic instruction during its session of 50 weeks, or from Aug. 1 to July 16.

The plan is as follows: One week half the boys are in the factory; the next week, accompanied by the shop coordinator, the same boys spend $3\frac{3}{4}$ hours in school (from Monday to Friday), while the boys who have been in the school the preceding week are at work in the shop under the instruction of a different shop coordinator or teacher.

The theoretical work done at the public school comprehends instruction in shop mathematics, mechanical drawing, blue-print reading, mechanics and industrial chemistry, civics and industrial economics, arithmetic, shop and business English.

The practical side of this plan or rather the shop side, uses no so-called "practice material." The apprentices are employed on actual productive work, making machine parts from castings brought directly from the foundry of the United Shoe Machinery Co. to the machine shop.

The boys are constantly under the direction of the shop coordinator and each boy performs several different operations upon a casting during his week in the shop. The same tests are made of the work of the boy by the company's inspector that are made of all other work, and if accepted, the work passes into the general stock of the company.

The apprentices are given practical and individual instruction by the coordinators on all the latest types of machine tools contained in a modern machine shop. The practice shop, where instruction is given to the boys, has been especially equipped for that purpose at a cost of nearly \$50,000 and is set aside for the instruction of apprentices to the machinist trade.

Aside from the two coordinators mentioned, there are shop assistants or assistant instructors who give their entire time to the instruction of the apprentices in the shops. The plan of payment for the productive side of this cooperative scheme is as follows:

The company keeps a separate account for the practice shop, debits it with all cost of maintenance, and credits it with the full value of all the products accepted. Half the piece price is paid to the boy; the other half goes to maintain the practice shop; or, in other words, the boy is paid for half of his actual earning capacity.

The expenses of this school are borne jointly by the public-school authorities and the United Shoe Machinery Co. The high-school

building is used for school work. The laboratories of the Mechanic Arts High School furnish the accommodations for the theoretical side of the plan.

The public-school authorities furnish three teachers, while the company furnishes two for the school instruction. Half the salaries of the two shop coordinators are paid from school funds, the other half being paid by the company. The salaries of the public-school teachers are paid by the public-school authorities.

FITCHBURG COOPERATIVE SCHOOL.

The Fitchburg (Mass.) High School's cooperative industrial course differs from the Beverly cooperative School in that the latter aims to give an elementary course of instruction to apprentices, while the Fitchburg school strives to give boys of high-school age an opportunity to learn a trade and at the same time continue their school training.

The Fitchburg school was inaugurated in September, 1908, a year earlier than the Beverly school. The Fitchburg Iron Workers' Association, an association of manufacturers, was instrumental in the establishment of this plan. The Fitchburg school differs from the Beverly school, inasmuch as the apprentices attending the former are employed by the several machine-tool manufacturing establishments of that city, instead of by one large corporation. Again it differs from the Beverly plan, for the reason that the apprentices must spend the entire first year of their course in the high school.

The first two months of the second year, or during July and August, the apprentices serve a probationary period in the shops of their prospective employers.

SHOPWORK.

While there is no official scheme of coordination by instructors in the Fitchburg plan, there is an understanding between the school instructors and the shop foremen that apprentices are to be advanced as rapidly in the shoppractice work as their ability to progress permits.

During the two months of the probationary period the apprentice is thoroughly tried for his fitness and adaptability for the trade. He is privileged to consult with his school instructor during this period, and if the instructor and the employer believe it is to the advantage of the boy and the employer to learn the machinist trade, he then becomes regularly indentured to the employer.

This scheme is carried on with the employers by prospective apprentices in the several shops until the 1st of September, when the boys are divided into pairs. At this point the actual cooperation begins by each boy spending a week in the shop and the alternating week in the school. From Monday to Friday one boy spends the entire day in the factory and the other attends school from 8 to 1 o'clock.

In addition to the school work, three hours per week of home study are required of each boy during his school week. On Saturday both boys are at work in the factory in order that the boy who has been in school during the week may sufficiently acquaint himself with the work his alternate has been doing to take it up and carry it on the following week, while his alternate is in school.

The apprentices are at work in the shop during all school vacation periods, with the exception of a two-weeks' leave of absence in the summer.

SCHOOL WORK.

The theoretic side of the plan, which is divided into 40-minute periods and which covers the entire term of the apprenticeship, is as follows:

First year.—The subjects taught in the first year are: English and current events, five periods; arithmetic, five periods; algebra, five periods; free-hand mechanical drawing (tables and simple shop problems) with bench work, eight periods. The school studies relate closely to shopwork.

The laboratory work which the pupil receives during the first year consists of instruction in the operations of lathes, planers, drilling machines, with bench and floor work and such other machine work as pertains to the particular branch of machine-shop practice as will be applicable to the particular branch of the machine industry in which the apprentice expects to be employed. This laboratory practice is continued throughout the entire four years of the cooperative school course.

Second year.—English, five periods; shop mathematics, five periods; physics, four periods; civics, two periods; mechanism of machines, five periods; free-hand and mechanical drawing, six periods.

Third year.—English, five periods; shop mathematics, five periods; chemistry, four periods; physics, four periods; mechanism of machines, five periods; first aid to the injured, one period; free-hand and mechanical drawing, six periods.

Fourth year.—English, five periods; commercial geography and business methods, two periods; shop mathematics, four periods; mechanism of machines, four periods; physics, electricity and heat, four periods; chemistry, six periods; free-hand and mechanical drawing, five periods.

The above studies are closely correlated with the shopwork. The English studies include forms of business papers and business English. A close study of shop terms and their significance is an important feature of the school work. Industrial history includes the study of daily happenings in the industrial world, the history of the iron industry, the factory system, new inventions, and a close study of mechanical journals.

Shop mathematics deals with problems on cutting speeds and feeds, gearing, strength of materials, and general cost finding. Mechanism includes a study of the construction and use of the various machine-tool parts. Physics becomes a study of the laws underlying mechanics; the study of working examples is emphasized. Chemistry takes up the nature and qualities of metals and salts, and tests that can be ordinarily applied to fractured metals, hardening, tempering, and improving processes.

Commercial geography includes the study of the source of supplies for various industries, methods of transportation, cost of materials, railway systems, waterways, etc.

There are three instructors in the school; one teaches shop and business English, another the sciences, and the third teaches shop methods and operations and industrial geography.

SUMMATION.

The preceding descriptive analysis purposes to show in considerable detail the workings of two types of half-time schools, i. e., the elementary and the secondary type, the former for boys of about 14 years of age and the latter for boys who have reached the age of 16. This analysis is sufficient to show the general scheme adopted by nearly all the half-time schools established within the past four years.

Table I shows the principal schools which have adopted a cooperative half-time plan, and gives a survey of the principal data concerning them:

TABLE I.—*Cooperative half-time schools.*

Name of school and location.	Year of establishment.	Minimum age for entrance.	Years in course.	Weeks of school in year.	Hours of school attendance per week.	Pupils entering must have passed—	Number of pupils in course.
Fitchburg High School, Fitchburg, Mass..	1908	16	4	20	23½	Grammar school.	80
Beverly-United Shoe Machinery Co., Beverly, Mass.	1909	14	2	25	38½	Sixth grade.	66
Technical High School, Providence, R. I.	1910	14	4	20	23½	Grammar school.	42
Freeport High School, Freeport, Ill.....	1909	15	4	20	26½	do.....	25
Lewis Institute, Chicago, Ill.....	1909	16	2	24	40	do.....	68
Cincinnati High School, Cincinnati, Ohio.	1910	16	4	48	24	Eighth grade.	175

In the schools in Fitchburg, Mass., Providence, R. I., and Freeport, Ill., the first year of the course is spent entirely in the school, the remaining three years are devoted to the half-time plan.

COOPERATIVE PART-TIME SCHOOLS.

Cooperative schools may be half time, part time, or continuation; usually the part-time school is a continuation school, but not necessarily so. Of the latter types, the part-time plan is one in which apprentices work regular hours in the establishments where they are employed except for a few hours a week, when they are excused from shopwork to attend school.

There is, however, another type of the part-time school which differs materially, inasmuch as the apprentice spends not a part of a day a week, but a few weeks of the school year in theoretic study of his trade.

The instruction in the part-time school is usually in public schools, but is becoming very common in philanthropic as well as Y. M. C. A. schools. The usual studies such as English, spelling and elementary industrial science, with shop arithmetic and mechanical drawing are provided.

CINCINNATI COOPERATIVE CONTINUATION SCHOOL.

The Cincinnati Cooperative Continuation School is without doubt the leading exponent of the part-time cooperative school. It is distinctively a creation of Cincinnatians. It was established in 1909 for the purpose of permitting boys at work in machine shops operated by members of the Cincinnati Metal Trades Association

to continue their studies, especially such studies as are closely connected with machine-shop practice, the aim being to coordinate with the training received in the shop the academic studies in school, and to increase the intellectual and industrial efficiency of the boys.

The entire expense of the school is borne by the board of education and amounts to about \$5,000 a year. It includes the salaries of three of the teachers and all the supplies and equipment. There are also about 18 men on the faculty who lecture to the classes without pay.

Some magnitude of the undertaking can be gleaned from the fact that there are approximately 250 apprentices in the school. There is a considerable waiting list, and pupils are accepted whenever there is a vacancy. The only requirement for entrance is that the apprentices shall have a common-school education.

Any apprentice 16 years of age or over, whose employer will give him time to attend, is accepted in the school. Apprentices are not compelled to attend by their employers, but most of the shops make employment contingent upon attendance, which, of course, amounts to compulsion. The general plan is as follows:

Each apprentice spends four hours per week in school and the remainder of the week at work in the shop of his employer. It is proposed throughout the four years to devote 45 minutes of the time each week to mathematics, 45 to science, $1\frac{1}{2}$ hours to the theory of shop practice, 45 minutes to general culture, and 15 minutes to physical culture. The following are the subjects taught in the four years' course:

First year.—Shop arithmetic, spelling, reading, composition, reading blue prints, drawing, geographical relations of the shop materials, and civics.

Second year.—Objective geometry; science—iron, its manufacture and founding; blue prints, mechanical and free-hand drawing; shop practice—shop conventionalities and necessities; civics and the reading of the lives of the world's improvers.

Third year.—Geometry and algebra, physics, shop practice, foreman's question box, drawing, civics, and economic history of literature.

Fourth year.—Trigonometry and applied mathematics; shop chemistry; shop practice—visiting industrial plants and discussing observations, especially of economy and waste; culture—the man as a wage earner and citizen; debates.

The school aims to accept the conditions presented by the trade and to accommodate itself to those conditions without a thought along the line of changing the conditions. This necessitates some compromises, as the shop can not send a boy to the class in which the instructor would like to place him, in some instances, and it has compelled the school to find a course of study which is flexible.

The apprentices from the machine and pattern-making departments are treated as one and the same type, and are divided into nine sections, each section spending a half day each week in the school for 52 weeks a year and for a period of four years.

The nine classes are arranged beginning on Monday afternoon and finishing on Friday afternoon, so that the less prepared pupil comes at the beginning of the week and the more advanced, or in some cases the bigger apprentices, attend the latter part of the week. The first effort of the school is directed to the holding of the apprentice to the

trade until he becomes accustomed to the environment and imbued with the possibilities which are offered.

Free-hand sketching, mechanical drawing and the reading of drawings are carried out on a scale of completeness commensurate with their use in the shops, the greatest amount of time and energy being placed on the making of free-hand and mechanical sketches to scale on rectangular and isometric coordinate paper. The mechanic must talk with his pencil and the apprentices are all taught to do lots of that kind of talking.

The manufacturers cooperating with the school are enthusiastic in their praises of its work. Instead of a decreasing output for the apprentices who spend four hours per week in school, it is found that in many cases the output has actually increased. The foremen of the shops, where apprentices are employed, have entered into hearty cooperation with the school and its director.

CLEVELAND COOPERATIVE PART-TIME SCHOOL.

The most recent development in cooperative part-time apprenticeship schools is one established jointly by the Cleveland, Ohio, manufacturers and the local Young Men's Christian Association, January 27, 1912. The purpose of the school is to give instruction to apprentices in the various mechanical establishments of the city in an effort to aid them in becoming skilled mechanics.

The academic studies consist of drawing, blue-print reading, and the usual kindred subjects. The class work is to be divided between two groups of apprentices, those who need individual instruction, as separate units, and those whose work can be adapted to instruction in large classes. Already five classes, with about 20 apprentices in each, are in operation. The course covers four years of 40 weeks each year, four hours each week.

An interesting feature of this part-time scheme is that the tuition fee of \$20 per year or \$80 for the complete course, is paid by the employer, in addition to the payment of regular wages to the apprentices while in school.

Fifteen representative manufacturing establishments have joined in this scheme. An advisory committee of experienced, practical men, who are to have general direction of the experiment, has been chosen from the Cleveland manufacturers.

In Table II are shown the philanthropic, as well as public schools, which have recently offered part-time instruction to apprentices in the respective cities:

TABLE II.—*Cooperative part-time schools.*

Name of school and location.	Year of establishment.	Minimum age for entrance.	Years in course.	Weeks of school in year.	Hours of school attendance per week.	Number of pupils in course.
Cincinnati Continuation School, Cincinnati, Ohio.....	1909	16	4	48	4	250
Franklin Union, Boston, Mass.....	1909	16	2	24	4	68
David Ranken, Jr., School, St. Louis, Mo.....	1910	16	2	46	7	30
Mechanics' Institute, Rochester, N. Y.....	1909	16	3	36	4½	98
State Trade School, Bridgeport, Conn.....	1910	16	2	35	4	60
Horace Mann School, Chicago, Ill.....	1907	16	4	12	27½	90
James Otis School, Chicago, Ill.....	1907	16	4	12	25½	152

APPRENTICESHIP SCHOOLS.

The establishment of schools by large corporations to give the academic training needed by the apprentices who are receiving their trade training in the employer's works, form part of a movement to restore the old apprenticeship system with such modifications as modern conditions make necessary. While the old time apprenticeship system was never formally given up, as a matter of fact, it almost entirely disappeared during the latter part of the last century. Many large corporations refused to take apprentices, but in cases where they were taken there was a strong tendency to use the apprentice as an operator long before he was thoroughly familiar with the practices and processes of his trade. In consequence, the average apprentice finished his trade poorly equipped to enter industry as a journeyman.

As a result of this condition employers have found themselves confronted with a scarcity of skilled workers, and this condition seriously hampers industrial enterprise.

However, within the last decade they have realized that the situation is grave and have begun the establishment of apprenticeship schools in order to secure a sufficient force of skilled workers, supervisors, and foremen, rather than to continue the policy of extreme specialization which was breaking down the industrial supremacy of this country.

Too much credit can not be given the large railroad corporations for the introduction of the modern apprenticeship system. They have begun the training of boys by indenturing them for a period of years with the sole object in view of giving them a complete, practical training, as well as instruction in mathematics, mechanical drawing, and elementary physics, necessary for the advancement in their trade.

In most schools the term of indenture is four years, and boys are required to attend school a specified number of hours during certain days of each week throughout the period of indenture. At the completion of the apprenticeship term, the boys are generally given their tools and a bonus varying from \$50 to \$150. The rate of pay is gradually becoming standardized in each shop according to the trade, and increased usually every six months.

In the greater number of railroad schools, as well as other employing establishments, school is in session five or six days of the week; but each boy usually attends two days only. This arrangement is made to prevent serious interference with shop organization resulting from the taking off of a large number of boys from a given department at the same time.

Few textbooks are used and the instruction is given mainly from lesson sheets prepared by the instructors in the several trades, closely correlating with the work in the shops performed by the boys when at gainful occupation.

In addition to the school instructor, many railroad schools employ one or more shop instructors who devote their entire time to instructing the boys in the performance of the operations in their several trades while in the shop, or supervising their rotation at various and increasingly important practices and processes of their trade.

For the most part these schools are situated at the employers' works. Attendance is compulsory; the time spent in school is paid for at the same rate as the working time.

School instruction bears close relation to shop practice, each and every school subject being taught with that particular reference, thus closely correlating the trade problems with the school instruction.

The school instructor is usually a man who has graduated from the working force, having been selected because of his thorough knowledge and familiarity with the trade, as well as a keen insight into modern methods applicable to the trade.

A survey of the schools established by the large railroad systems extending from the Atlantic to the Pacific, and from the Canadian border to the Gulf of Mexico, disclose the interesting fact that courses for apprentices in 22 specific trades have been established since 1905.

The total number of pupils in these schools, and other apprenticeship schools established by manufacturing concerns throughout the United States, are 3,946.

The total number of machinist apprentices in these schools is 2,865, or about 72 per cent of the entire number of pupils; the average entrance age, 16 years; the average number of years in the course, 4; and the average number of weeks in the course, 42.

The courses of instruction in these schools include, exclusive of practice work, such subjects as algebra, arithmetic, chemistry, geometry, English, physics, mechanism, mechanics (strength of materials), free-hand drawing, mechanical drawing, machine design, elementary electricity, mensuration, trigonometry, hydraulics, thermodynamics, shop mathematics, and bookkeeping.

The railroads which have established schools on their systems throughout the country are: New York Central; Santa Fe; Grand Trunk; Erie; Pennsylvania; Union Pacific; Delaware, Lackawanna & Western; Delaware & Hudson; Central Railroad of New Jersey; Chicago Great Western; Pere Marquette; St. Louis & San Francisco; Southern; Cincinnati, Hamilton & Dayton; and Alabama Great Southern.

The location of schools on the New York Central system is as follows: Beech Grove, Ind.; Collinwood, Ohio; Depew, N. Y.; East Buffalo, N. Y.; Elkhart, Ind.; Jackson, Mich.; McKees Rocks, Pa.; Oswego, N. Y.; West Albany, N. Y.

The location of schools on the Santa Fe is as follows: Topeka, Kans.; Albuquerque, N. Mex.; Amarillo, Tex.; Wellington, Kans.; Argentine, Kans.; Chanute, Kans.; Arkansas City, Kans.; Newton, Kans.; Bakersfield, Cal.; Needles, Cal.; Winslow, Ariz.; Cleburne, Tex.; Clovis, N. Mex.; San Marcial, N. Mex.; Galveston, Tex.; Silsbee, Tex.; Somerville, Tex.; Temple, Tex.; La Junta, Colo.; Pueblo, Colo.; Raton, N. Mex.; Richmond, Cal.; San Bernardino, Cal.; Fort Madison, Iowa.

The location of schools on the Grand Trunk is as follows: Battle Creek, Mich.; Saint Albans, Vt.

The location of schools on the Erie is as follows: Dunmore, Pa.; Hornell, N. Y.; Meadville, Pa.; Port Jervis, N. Y.; Susquehanna, Pa.

The location of schools on the Pennsylvania is as follows: Altoona, Pa. (The railroad company cooperates with the extension department of the Pennsylvania State College.)

The location of schools on the Union Pacific is as follows: Omaha, Nebr.; Cheyenne, Wyo.

The location of schools on the Delaware, Lackawanna & Western is as follows: Scranton, Pa.; Kingsland, N. J.; East Buffalo, N. Y.

The location of schools on the Delaware & Hudson is as follows: Carbondale, Pa.; Green Island, N. Y.; Oneonta, N. Y.

The Central Railroad of New Jersey maintains a school at Elizabethport, N. J.

The Chicago & Great Western maintains only one school, and that is at Oelwein, Iowa.

The Southern Railway has established schools at Spencer, N. C.; Knoxville, Tenn.; Birmingham, Ala.; and Atlanta, Ga.

The Cincinnati, Hamilton & Dayton has one school, located at Lima, Ohio; and the Alabama Great Southern has established a school at Birmingham, Ala.

Establishments other than railroad corporations which furnish instructions to their apprentices are as follows:

General Electric Co., West Lynn, Mass.

Western Electric Co., Chicago, Ill.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Westinghouse Air Brake Co., Wilmerding, Pa.

Brown & Sharpe, Providence, R. I.

International Harvester Co., Chicago, Ill.

Yale & Towne Manufacturing Co., Stamford, Conn.

R. Hoe & Co., New York, N. Y.

Geo. V. Cresson Co., Philadelphia, Pa.

Fore River Shipbuilding Co., Quincy, Mass.

American Locomotive Co., Dunkirk, N. Y.

Cadillac Motor Car Co., Detroit, Mich.

Lakeside Press, Chicago, Ill.

North End Union, Boston, Mass.

Solvay Process Co., Solvay, N. Y.

Manufacturers' Association, Bridgeport, Conn.

Baldwin Locomotive Co., Philadelphia, Pa.

MASSACHUSETTS INDEPENDENT INDUSTRIAL SCHOOLS.

The development of industrial education in Massachusetts has been approached upon the general theory that through the voluntary establishment of schemes in different communities a considerable number of what may be called experiment stations could be established, and that in this way a large amount of information could be accumulated as to the most efficient methods of dealing with the organization, establishment, and efficiency of these schools. To specifically encourage the establishment of such schemes, legislation has provided for State aid to the amount of one-half of the running expenses of such schemes as might be approved by the State board of education. The present legislation, together with the wide authority conferred upon the school committees under the general statute, has made possible the establishment of a large number of schemes, some of which are being carried on by the community at its own expense, usually in conjunction with the regular public schools, and others being carried on under the special legislation making possible State aid.

The present status of industrial education presents, therefore, the following:

Schemes maintained at public expense.

- (a) Under the general authority of the school committee.
- (b) Under the specific authority conferred by special legislation.
(Schemes in this group are practically all State aided.)

Schemes conducted at public expense.

(a) *Under the general authority of the school committee, but not State aided.*—These schemes have taken in general the form of a proposition to introduce into a high school special courses training for industrial efficiency. The older form has been the establishment either of a technical course within a high school or of a technical high school, but more recently have taken the form of part-time work based upon the Cincinnati scheme. Boys electing this course are placed in various local shops and alternate on a weekly basis between the shop and the school.

(b) *Under special legislation.*—Under the modified legislation of 1911 cities and towns may establish special schemes controlled either by boards of trustees or by the local school committee. It is generally considered that such schemes represent an extension of educational work beyond that normally contemplated under the general educational statutes. Owing to the large amount of State aid available if such schemes are approved, practically all schemes conducted under chapter 471 are so conducted as to meet with the approval of the State board and to receive reimbursement from the State. Under this scheme the following types of schools have developed:

(1) *Day schools.*—Where the pupil is placed in a commercial shop for his shoptraining, considerable difficulty has arisen in controlling his shop experience so that it should be efficient. Since a commercial shop is operated for profit, there is obviously considerable difficulty, even with the best intentions, in so controlling and regulating the experience of the student that he shall be most efficient from the training standpoint. This difficulty has been met by establishing schools controlling the experience of the pupil by operating their own shops, and there have been up to the present time two main types of schools of this general character.

(a) In this type of school the student's entire experience is secured under the school roof, but it is in a sense a part-time school in that the student spends a week in the school shop under educationally commercial conditions, and then spends a week in the academic side of the work. In general, this type of school would present a carefully controlled shop experience on the part of the pupil paralleled by a closely correlated course in academic and related technical work, the two experiences being blocked out in weekly units.

(b) In this type of school while undertaking to make a controlled-shop experience a part of its responsibility an attempt is made to more closely correlate the shopwork with the academic work. The alternation between shop and school is more frequent, usually in terms of a half day, and a considerable use is made, especially in the earlier parts of the course, of the method of dealing with the pupil individually and bringing out in connection with each piece of work the related technical and academic work on what has been designated as "the project method" of instruction.

It should be noted that day schools of either of the types indicated above assume full responsibility for the training of the pupil, both in trade manipulations and in the related technical and academic work, as well as furnishing instruction in civics and other courses of that character designed to train for efficient and intelligent citizenship.

(c) Part-time schools or part responsibility schools are intended to give instruction in related technical and academic subjects to students employed during the day, such instruction being given within the working period. Up to the present time schemes of this character have been conducted to a limited extent, but sufficiently to indicate that such work is practicable, at least in certain industries. Up to the present time such courses as have been conducted have been mainly in connection with the machine shop industry. A similar course in textiles will probably be established next year in one locality.

Up to date it may be fairly said that in proportion as a school undertakes to deal with the average 14-year-old child the methods of instruction must differ more and more from those of the regular schools. It has been found that the more closely the related academic and technical work can be connected directly with the job, the more efficient is the educational side of the work and the greater the number of pupils who can profit by the work. In proportion as the academic and shop experiences are made parallel, but not closely connected, it appears to be necessary that the school should deal in general with pupils of the general type of those who can successfully deal with ordinary high school work.

(2) *Evening schools.*—The general principle underlying the establishment of evening industrial schools in Massachusetts where operated under special legislation and State aided has been that they should not induct into a trade, but should aid the person already engaged in an occupation to further perfect himself in his trade. For that purpose such courses are restricted to persons over 17 years of age already engaged in the industry. Up to the present time all evidence would indicate that the most efficient work is what has been called the "short unit course." Such a course takes a group of students all engaged in the same occupation and having about the same degrees of experience and undertakes to give them directly some one thing which they need, as, for example, blue-print reading for machinists' apprentices, or stair building for inside finishers. In proportion as these evening courses have been conducted along the lines indicated above they have shown increasing efficiency, both from the testimony of the students and from the decreasing percentage of absence. This type of course may be fairly said to be the typical form of evening course approvable according to the present standards of the board of education.

The general progress of industrial education in Massachusetts in the last few years has been somewhat as follows: A tendency to pass from the school undertaking to give technical and academic work, leaving the industry to furnish the shop training to institutions undertaking to control both the shop training and the academic and technical instruction. In the attempt to deal effectively with the average 14-year-old boy and girl, for whom these schools were especially designed, it has been found that in proportion as a close correlation is established between the shop and academic training it is

possible to deal successfully with more and more of these children and to hold them for a longer period. The economic factor, however, appears to have entered into the problem to such a degree that under present conditions the great mass of the children employed in the State will not be effectively reached by the full-time day school, so that the present tendency is to encourage the part-time day school in addition to the full-time day school of the character noted above. This condition is partially met by the evening courses dealing with the boys and girls after they have entered the industry. Physiological and other reasons, however, would indicate the undesirability of undertaking to deal in evening courses with children, at least between the ages of 14 and 17, who are working during the day. It appears, therefore, that the next step in the development will undoubtedly be in the direction of the establishment of more and more part-time courses which will withdraw the juvenile worker from the industry for a portion of the working time and continue his academic and related technical education during that period in a part-time day school. The limited number of courses of this character established up to the present time and the limited number of industries with which they are now dealing has prevented the accumulation of very definite data. There is very little question, however, but what there will be a rapid development along these lines in the near future.

For the training of women and girls there has been up to the present time established but one type of day school, which gives training for the needle trades. A number of such schools have been established in the State and are State aided. The general scheme is a somewhat frequent alternation between a controlled trade experience in the shop and closely correlated academic and technical work. The majority of these schools operate evening courses also for girls already engaged in industry, under the limited conditions pointed out in evening courses for men.

Legislation making possible the establishment of schools for males and females desiring training in connection with the productive side of industry has also recognized the necessity of training women and girls for the efficient management of the household. The same general statements as to the agencies engaged in this work would apply here as in the case of industrial work. Departments of home making have been established in certain day schools, whose aim is to train for efficient management of the home, combined with a technical and academic training. The general theory in which these departments are operated is to consider that the efficient management of the home and the intelligent expenditure of income is as much a distinct trade or occupation as is an occupation by which money is earned, and to organize these schools in general on the same basis as the strictly industrial schools. A number of serious problems have arisen in the development of these departments, among them the difficulties of giving what may be called practical shoptraining in such subjects as cooking, dressmaking, etc., as the problem of training the girl in cooking in the preparation of family quantity of food, in training in dressmaking of the home character to find practical useful work in sufficient amount to give the adequate training, and although considerable progress has been made in devising the methods by which the training may be made of a practical character, it

must be frankly admitted that there must be considerable more experimentation before the problem will be fairly worked out.

The general training for home making presents about the same general phases as the industrial training. Part-time courses have been to some extent established for girls engaged in industry, they being released during a portion of the working week and attending a part-time day school for training looking toward home-making efficiency. While this work has been too recently established to afford a great deal of data there is no question but what this is a field which will be largely developed in the near future and which will yield very valuable results. The work already done in these courses, the attitude of the girls, and the efficiency of the work done so far all indicate that we have here a method of dealing with a group of girls which could be reached in no other way and dealing with them effectively.

Evening courses in women's work have been largely conducted. The restrictions placed upon the attendance on State-aided courses operated under chapter 471 have in the past prevented the attendance upon such courses of girls engaged in wage-earning occupations during the day who were not engaged in household occupations. Thus the girl working in a factory, the telephone operator, or the stenographer have been unable to avail themselves of the opportunities offered by State-aided evening courses training for efficiency in the home. In recognizing the desirability of such training the legislature of 1912 enacted chapter 106,¹ making possible the operation of State-aided courses giving training for domestic efficiency to women and girls employed during the day without regard to the character of that employment.

LIST OF PUBLIC SCHOOLS IN MASSACHUSETTS OFFERING VOCATIONAL TRAINING.

Beverly.—Independent Industrial School (part time) offers courses in machine shop work. Enrollment 70.

Boston.—Independent Evening Industrial School offers the following: Drawing and plan reading for building trades; drawing for machinists, sheet-metal workers and ship fitters; free-hand drawing, industrial design, interior decorating; management of steam plant for janitors, engineers, and firemen; plumbing, pattern making, forging, toolmaking, machine-shop practice. Enrollment 900.

Part-time School of Household Arts. Enrollment 75.

Independent Industrial School for Boys² offers courses in electrical work, woodworking, metal working, printing and machine-shop work. Enrollment 96.

Trade School for Girls offers in day classes the following: Dress-making, millinery, power machine operating and household arts.

¹AN ACT To provide for the establishment and maintenance of evening classes in the practical arts for women.

Be it enacted, etc., That any city or town may, through its school committee or other board of trustees for vocational education, establish and maintain separate evening classes in household and other practical arts. Such classes shall be known as practical art classes, shall be open to all women over seventeen years of age who are employed in any capacity during the day, and may be established and maintained as approved State-aided practical art classes under the provisions of, and subject to all the conditions, not inconsistent with this act, of chapter four-hundred and seventy-one of the acts of the year nineteen hundred and eleven. (Approved, February 16, 1912.)

²Day school only.

Enrollment 435. In evening classes the following are offered: Cooking, power machine operating. Enrollment 142.

Cambridge.—Independent Evening Industrial School offers courses in machine-shop practice and shop mathematics, blacksmithing, woodworking and pattern making. Enrollment 59.

Chicopee.—Independent Evening Industrial School offers the following: Wood turning, pattern making, cabinet making, mechanical drawing, machine drawing, architectural drawing, machine-shop practice and automobile construction. Enrollment, 125.

Everett.—Independent Evening Industrial School offers the following: Woodworking, mechanical drawing, shop drawing for structural steel workers, power work for engineers and electricians, shop mathematics, machine-shop work, household arts and dressmaking. Enrollment, 122.

Hodley.—Agricultural department in Hopkins Academy.¹ Enrollment, 15.

Harwich.—Agricultural department in High School.¹ Enrollment, 15.

Holyoke.—Independent Evening Industrial School offers the following: Machine drawing, carpentry, steam engineering, and cooking. Enrollment, 180.

Lawrence.—Independent Industrial School¹ offers in day courses the following: Machine-shop work, electricity, pattern and cabinet making, textiles, dressmaking, millinery, and household arts. Enrollment, 179. In evening classes the following courses are offered: Steam engineering, chemistry and dyeing, cotton spinning and carding, cotton and worsted loomfixing, designing, yarn calculations, electricity, blue-print reading, architectural drawing, woolen and worsted manufacturing through spinning, cooking, and dressmaking. Enrollment, 886.

Lowell.—Independent Industrial School offers in day courses the following: Machine work and blacksmithing, woodworking, electricity, automobile repairing, dressmaking, and household arts. Enrollment, 174. In evening classes the following courses are offered: Machine-shop practice, electricity, boiler firing, carpentry, steam engineering, automobile repairing, plumbing, weaving and loomfixing, ring spinning, picker and card room practice, mill arithmetic, household arts, millinery, and dressmaking. Enrollment, 842.

New Bedford.—Independent Industrial School offers in day classes the following: Woodworking, steam-engine practice, machine-shop practice, building construction, electricity, household arts, millinery, and dressmaking. Enrollment, 203. In evening classes the following courses are offered: Millinery, dressmaking, household arts, electricity, automobile repairing, special machine work, steam engineering, stair building, pattern making, roof framing, machine drafting, and plumbing. Enrollment, 628.

Newton.—Independent Industrial School offers in day classes the following: Woodworking, machine-shop work, electricity, and printing. Enrollment, 59. In evening classes the following courses are offered: Sewing, dressmaking, cooking, machine-shop practice, machine drawing and blue-print reading, architectural drawing, shop mathematics. Enrollment, 235.

¹ Day school only.

Northampton.—Smith's Agricultural School and Northampton School of Industries¹ offers courses in agriculture, household arts, and woodworking. Enrollment, 150.

North Attleboro.—Independent Evening Industrial Sshool¹ offers courses in shop chemistry, jewelry design and modeling, shop mathematics, and English. Enrollment, 48.

Northboro.—Agricultural department in High School.¹ Enrollment, 16.

Petersham.—Agricultural department in High School.¹ Enrollment, 15.

Quincy.—Independent Evening Industrial School offers courses in mechanical drawing and monument design. Enrollment, 80.

Somerville.—Independent Industrial School for Boys¹ offers courses in woodworking and metal work. Enrollment, 80.

Independent Industrial School for Girls¹ offers courses in dressmaking and millinery. Enrollment, 65.

Springfield.—Independent Industrial School for Boys¹ offers courses in woodworking and metal work. Enrollment, 80.

Taunton.—Independent Evening Industrial School offers courses in shop drafting, architectural drafting, and industrial design. Enrollment, 24.

Watertown.—Independent Evening Industrial School offers a course in drawing for machinists. Enrollment, 13.

Westfield.—Independent Industrial School for Boys¹ offers courses in woodworking and metal working. Enrollment, 24.

Worcester.—Trade School for Boys offers in day classes the following: Steam-engine practice, machine-shop work, woodworking, cabinet and pattern making. Enrollment, 180. In evening classes the following courses are given: Mechanical drawing and blue-print reading, pattern making, cabinetmaking and house framing, lathe work, planer, miller, grinder, gear cutting, gasoline-engine practice, shop computations for machinists, electric wiring and motor work. Enrollment, 347.

Trade School for Girls¹ offers courses in dressmaking and sewing, millinery, power-machine operation. Enrollment, 90.

Total number of cities and towns where some form of vocational education is being maintained, 35.

Subjects taught in day classes.—Machine-shop work, household arts, electricity, metal working, printing, dressmaking, millinery, power-machine operating, blacksmithing, agriculture, pattern making, cabinetmaking, textiles, automobile repairing, steam-engine practice, and building construction.

Subjects taught in evening classes.—Drawing and plan reading for building trades; drawing for machinists, sheet-metal workers, and shipfitters; free-hand drawing; industrial design; interior decorating; management of steam plant for janitors, engineers and firemen; plumbing; pattern making; forging; toolmaking; machine-shop practice; cooking; power machine operating; woodworking; mechanical and architectural drawing; automobile construction; shop drawing for structural steel workers; powerwork for engineers and electricians; dressmaking; shop mathematics; steam engineering; chemistry and dyeing; cotton spinning and carding; woolen and worsted loom fixing;

¹ Day school only.

yarn calculations; electricity; blue print reading; woolen and worsted manufacturing through spinning; plumbing; weaving; ring spinning; picker and card room practice; mill arithmetic; household arts; stair building; roof framing; jewelry design and modeling; monument design; house framing; gasoline-engine practice.

NEW YORK STATE FACTORY SCHOOLS.

With the passage of a law authorizing vocational schools there came the problem of administering them in the letter of the law and at the same time to continue the best traditions of our State system of education.

The problem was deeper than the mere establishment of a few isolated and special schools. It was the problem of establishing a new type of education which would work alongside of, and not be antagonistic to, an older type. It was to be a type that would assist the older in doing better a few things that its good intentions led it to do and at the same time developing within itself a line of work which it could do a bit better than its neighbor who had primarily other things to do.

THE INTERMEDIATE INDUSTRIAL SCHOOL.

The plan as now operating provides that five-twelfths of the school program shall be given over to shop, laboratory, and drawing instruction and that the remaining seven-twelfths be devoted to "book studies," which practically amounts to saying that the pupils shall for the remainder of the time take the regular elementary school studies corresponding to the seventh and eighth grades. These studies are related to the industrial studies as far as is possible. Both boys and girls have similar work in English and history. The arithmetic course for boys differ from that for girls. The geography is viewed as an outgrowth of the life-long problem of providing food, clothing and shelter. The physiology is studied from the viewpoint of hygiene and sanitation rather than the structural only. The shop, laboratory, and drawing work differs with the sex considered.

The questions naturally arise: Are these children receiving an education? Can they enter the high school? One superintendent writes:

We had no trade school for our graduates of the intermediate industrial school to enter. They were obliged to enter our regular courses in the high school. We had hardly expected that many would care to. That was one reason for advising them to enter the vocational school. The majority, however, did enter the high school and for all I can see are doing as good work as those who finished the eighth grade in the regular schools.

On the surface it would seem impossible to do as much bookwork in seven-twelfths of a day's program as the regular seventh and eighth grade pupils accomplish in a whole day; nevertheless, thus far the pupils in the intermediate industrial schools seem to be accomplishing it. Let us note the possible reasons. We must remember (1) that in the vocational sections a teacher does not handle more than 25 pupils at a time and more individual instruction is possible; (2) that the book studies of English, history, and geography may be so correlated that penmanship and spelling are brought into every

written lesson and that practice in reading appears in the history and geography; (3) that the bookwork is not interrupted by the visitations of a drawing, music, or manual arts supervisor; (4) that the connection between the shopwork and the bookwork is so close that one naturally assists the other; and (5) that the hours spent in the shop and drawing room afford a relief from brain fatigue.

VOCATIONAL COURSES IN THE HIGH SCHOOL.

The education department has developed a plan by which an average high school now teaching college preparatory, commercial, industrial, and home-making subjects can economically and effectively develop courses of instruction along the lines suggested by the syllabus which shall have a well-blended, liberal, and vocational training. Instead of these schools offering commercial, industrial, and home-making subjects it is proposed that they offer well-defined courses for pupils who seek different destinations. A certain amount of the work will be common to all these courses and will consist of the prescribed studies which are deemed essential to a sound and symmetrical education and which, under normal conditions, should be prescribed for all pupils in a secondary school. These prescribed studies are English for four years, English history, American history with civics, algebra, plane geometry, biology, and physics. Another division consists of such elective subjects as may be necessary for pupils seeking different destinations. It can not be emphasized too often that a vocational course does not consist merely of vocational subjects thrown at random into a high-school system. The vocational purpose must be satisfied by a definite course.

The subjects of manual and agricultural arts have not been incorporated in the college preparatory or commercial groups. No one is willing to say that it is a waste of time for a boy in the college preparatory group to elect some handwork, but a better time to gain the most effective educational value from this subject is when the boy is in the seventh and eighth grades. To take shopwork without accompanying it with strong courses in mechanical drawing, related science and mathematics is to overlook the educational importance of true educational handwork in the secondary school. A line of shopwork which merely consists of making a few articles of furniture, which simply train skill of hand, and which has nothing to do with vocational direction or with other school studies, has not the educational value to which the high school boy is entitled. Of course we are considering that handwork in secondary schools is to have educational value. If it is given merely to gain credits or to keep the boy busy or happy or out of mischief, then, of course, serious educational questions of how to make the manual arts really effective have no place in this discussion.

The law states clearly certain conditions which a vocational school must meet in order to be considered as entitled to special State aid. (1) It must be independently organized—not necessarily a separate building but most assuredly established with a distinct vocational purpose in mind; (2) it must have an enrollment of at least 25; (3) it must employ the full time of a teacher; and (4) it must have a course of study meeting the approval of the Commissioner of Education. The first three conditions admit of no changes and are to be enforced

in all places without variation from the word of the law. The fourth condition allows for considerable latitude and discretion. The course of study is not defined by the law; it may vary in different localities and connect with the different local industries, which vary in different parts of this great State. The course of study in agriculture and related subjects may emphasize dairying in St. Lawrence County, and fruit growing in Ontario County. An industrial course may concern itself with the shoe industry of Rochester or the knitting mills of Utica; it may omit mechanical drawing in Gloversville and emphasize it in Schenectady. The vocational training may be of rather the general industrial nature in Albany or have its specific trade aspects in Lackawanna. The only points that need to be considered in the establishment of such a school course in a high school system are: (1) Is it established to meet the vocational purpose in education? (2) Does it meet the requirements of the law?

The department has ruled that five-twelfths of the weekly program of a vocational school department of a high school must be given over to the vocational studies chosen from the elective group. This particular ratio was settled upon after considering two propositions. (1) The present requirements for an academic diploma call for 41 counts in certain studies, primarily liberal. These counts closely approximate seven-twelfths of the total number, 72, required for a diploma. (2) Vocational training of high-school grade demands a certain amount of liberal training. Preparation for a vocation should have academic recognition through a diploma if the work is of high-school grade. The placing of the ratio five-twelfths vocational to seven-twelfths liberal will satisfy the time elements of both divisions of the course of study. Consequently the pupils in the vocational school course have the same liberalizing studies, or their equivalent, as do pupils in other courses. They take the same department examinations in English, history, algebra, geometry, and biology when they follow the same syllabus as other pupils. When the school offers, as it should, special and practical courses in mathematics and science beyond, or in place of, those just mentioned, the work is inspected and if the definite outlines submitted to the department are satisfactory, if the teacher is trained for his work, and if it is seen that he can make direct and useful applications of the abstract to the concrete shop, laboratory, or field work of the home and the school, then the department grants credits without examination. No examinations are given in the vocational subjects proper.

THE TRADE SCHOOL.

The policy of the open door in education demands, not as some are inclined to favor, the avoidance of a type of school which will definitely prepare, as far as a school may, boys and girls for specific trades, but rather the definite establishment of schools which will accomplish this purpose. It is evident from the discussion of the place of the general industrial school and the vocational school courses in existing high schools that ample justice has been done to the open-door policy. Pupils in the former school have received not only a good elementary education but also have made the beginnings toward a preparation for trade and industry. In the latter type every opportunity has

been given to encourage in every possible manner a type of vocational training which may very properly belong to a class of pupils enrolled in a secondary school. Its course of instruction is dignified, thoroughly educational, and worthy of recognition equivalent to other high-school courses. No boy capable of doing what amounts to an equivalent of high-school work is prevented from doing vocational work of that order and from receiving academic recognition for his accomplishment. He will upon graduation take, or will make his way to, that place which befits one who has completed a course of instruction covering 12 years of his life. For the school system to have been able to do the definite work of preparing pupils of high-school age and attainment for definite vocations and at the same time to have given them the equivalent of a high-school education is a test worthy of any secondary school.

The work of preparing our youth for vocations, however, is not completed with either of the schemes proposed, for two reasons: (1) The general industrial school, which is a feeder to the apprenticeship system or to a higher school, is based upon the supposition that somewhere a door is open to its graduates. One of these higher schools is the vocational-school course in the high school; the other is the trade school. (2) In order that there may actually be an open door, it is necessary that the school system make provision for those who desire further education but do not care for, and it may be presumed can not successfully maintain, the academic standards of a course of study which parallels in any way the regular high school.

The general industrial, or intermediate industrial, school is intended to explore through various kinds of industrial work the industrial capacities of children. It assumes that teachers will keep a watchful eye upon individual interests. In short, it assumes that when a boy leaves this school he has some knowledge of where he is going and some preparation for his work. Some boys will know, for example, that they want to be plumbers. They know this because the intermediate school gave them some instruction in tinsmithing, sheet-metal work, and mechanical drawing, together with the elements of other groups of trades. They deserve the open door: To open the door to a high-school course is to offer an opening through which they can not and will not pass. In effect, it is really a closed door. To furnish them a place where they can learn a trade after they have settled upon it is the best kind of an open door.

There are some very definite principles in the organization of trade schools which need to be considered.

1. Pupils enter these schools with a well-defined purpose. The period of trying out is finished. They are there to learn a specific trade to the full extent that is possible in any school plan.

2. This type of school absolutely abandons any specific instruction in the so-called liberal studies. This may seem harsh, but we must remember that the pupil has enrolled for one purpose and it is fortunate that the school has even one thing, narrow though it may appear to be, to offer him. The pupil of a trade school is not the type that can be held in school through any liberal studies which are frankly apart from his pressing needs as he sees them. We must recognize that he is 16 years old, that his school days are numbered, and that if his participation in the educative process for eight years before coming to the school has not done something in the way of

liberal training, it never will. There is no law compelling him to attend school, possibly no parents who have broad ideas of educational values, no full pocketbook to allow for leisurely walking through the halls of learning—nothing but the bare economic necessities of the individual case. All the culture which he is to receive must come directly from his trade instruction. The question naturally arises, How much can trade instruction do to make him see beyond the attainment of mere hand skill? A great deal. In the first place, it is assumed that the trade instructor is himself a man who has the true spirit of craftsmanship. He may not be learned, as the saying is, but he has a clean character, believes in honest work, knows something of the economic questions which enter into his trade, reads his weekly trade paper, is able to apply those book and technical studies which have direct application to his craft, and has the ability to inspire his pupils by personal example and instruction to do the best for themselves. In the second place, it is taken for granted that there can never be genuine trade instruction without some accompaniment of the application to the trade practice of mathematics, science, economics, and other subjects.

3. The trade school organization requires a very different method than is now, or is likely to be, in vogue in other types of vocational training. The intermediate and secondary vocational schools have in their organization a number of teachers—some on the shop and some on the bookwork side. The shopwork and bookwork are closely correlated, but this is brought about through cooperation between two kinds of instruction, one primarily vocational, the other primarily liberal and disciplinary. Fortunately, both have the good sense to work together for a common end. The problem in such schools is one of making a close adjustment between the two kinds, and the success of these types, as has already been pointed out, depends largely upon the definiteness of their relationship. One sees, however, that there is always the problem of adjustment, and the more subjects in the course and the greater the number of teachers to which each pupil reports the more difficult becomes the fulfillment of this adjustment. But the trade school organization is on a very different basis. Here the particular trade represented forms a school in itself. There should be no departments of history, English, mathematics, drawing, etc., in this type of school. These subjects, or others which are necessary to trade proficiency, must be taught by the teacher of the trade. He is the master craftsman who knows what is needed quickly and effectively to prepare pupils for the craft which he represents. He asks no aid of a teacher of mathematics or science. He spends no time attempting to bring about an adjustment of the work of another teacher to his particular work. The pupil should not have to adjust two ideas as presented by two teachers. It is one trade taught by one teacher.

Probably an example or two will make the foregoing principle clear. Consider the teaching of the printing trade. A room is set apart in a school building; a first-class, clean-cut printer is engaged as a teacher; a proper equipment is provided; not more than 15 pupils are enrolled in the class. The trade problem before us is the printing of the school report. Many points must be considered beyond the mere picking up of the type. The type must be selected with due regard to size of book and the expense involved. The

proper paper has to be selected, its finish, the size of the sheets to be cut up into leaves, the number of folios estimated from the amount of manuscript for the quantity of paper required, the proper proportion of width to length of page, the colors of the ink, the tone of the cover, the spacing of the title-pages, the ornamentation, the tail-pieces, the border lines, the position of the cuts inserted, the proper spelling, paragraphing, punctuation, etc. Here are questions which lead into arithmetic, design, spelling, grammar, and punctuation. We do not need to send the pupil to the drawing teacher, to the teacher of arithmetic, or to the teacher of English. If our teacher of printing is what we expect him to be, he knows the answers to the questions, and it will be his business to bring before the individual these points when they come up in the problem.

Consider another illustration—that of the plumbing trade. Questions arise about the reading of house plans, of applying simple problems in the flow of liquids, of using different forms of traps, of knowing tables of specific gravities, of weights per linear foot of different materials, of cubical contents of different vessels, of melting points of different solids, and of estimating cost of installation of plumbing fixtures. This work need not be delegated to various departments of mathematics, science, and drawing. Our plumbing teacher knows his business, and the time of the boy is short.

It is readily seen that somehow, unconsciously perhaps, the pupil has absorbed some of the disciplinary studies of which we were afraid he was about to be deprived. Furthermore, the teacher can do something more than we sometimes think toward giving the pupils a taste for the liberalizing studies of economics and history. It is assumed that our teacher is really alive to the human needs of the vocation, that he knows about trade unionism, the effect of hours and wages upon prices, something of the history of printing, the benefits to human progress of the invention of the printing press, and a score of other points which have made him, through reading and observation, an intelligent printer. One has no right to suppose for a moment that this information is not to be drawn out of our instructor by wide-awake boys, that the class is not going to ask questions about these things, that the teacher is not going to respond. Besides, we expect that the school will invite men prominent in the trade to talk to the boys about the technical and economic questions involved in the art of printing. There is more "education" in a trade school than one is prepared to see at first glance. To be sure some trades do not appear to have very much educational content. It is easy to settle this point, for these trades will not be taught in a school. Trade schools are a part of an educational system—not a part of a scheme which merely supplies the labor market with a material less capable than it now has.

4. The trade schools must keep longer hours than the present schools. In this respect, as in many others, they must approach shop conditions. They have no connection with other schools; the pupils do not recite any subject with others. The trade school is the professional school for the industrial workers and it presupposes that it is his final schooling place and that he desires to make his time of attendance as short as possible consistent with all-around trade training. He is there to reduce his time of apprenticeship and every hour counts. If he was not in the school he would be in the shop or factory

working 54 hours a week, and it will not be any hardship to provide longer school hours for him.

5. The trade-school pupil ought, in justice to his vocational preparation, abandon all ideas of going to college—not that he will be prevented from going to a higher school, but rather that his particular open door leads to the factory or shop. It is his professional school, just as for others is a law, medical, or dental school. No lawyer is prevented from becoming a minister, but a change in vocational purpose necessarily means a retracing of educational effort. At some time everyone must decide what he proposes to do, and then go about to accomplish his purpose.

6. The classes in a trade school will have a smaller class unit. It will be impossible to give proper instruction to a class numbering over 15 or 20. Most of it must be, in the nature of the case, individual instruction.

7. Obviously, the trade school can not guarantee finished workmen any more than the law schools send out finished lawyers. The combination of school training and actual practice will make very efficient workmen. The trade school, with its shopwork and its theory of trade practice, will lay an excellent foundation upon which to build individual advancement when the worker enters the shop.

SYSTEM OF CONTINUATION SCHOOLS.

Industrial education needs to extend to the still smaller industrial communities. It should relate itself in some way to specific trade needs.

It is safe to assume that the only solution open for these small places by which they can provide definite instruction in trade lines will be for them to establish day continuation schools which provide for an equitable distribution of the responsibilities for instruction between the shop in which the youth is employed and the school in which he may be expected to attend for a few hours a week. All the bookwork in the schools applies directly to the business in which he finds himself, when the trade at which he is working calls for any special knowledge, while the shop itself supplies the trade atmosphere. In this way the boys and girls in the smaller industrial centers will be receiving vocational training, and will not be neglected as they necessarily will be if the State considers a scheme of industrial training which includes only general industrial vocational courses in high schools and trade schools. The city of Lackawanna will serve as a good illustration. At present it has no manual training and no vocational training of any nature. It has a relatively small high-school enrollment. It has a class of people which expects its children to go to work early. There is but one great industry in the city, and that is steel manufacture. The interests of the city and of the industry are closely united. Something should be done in the way of vocational training, but no plan will work which does not provide on the part of the boy for "earning as well as learning," and for the avoidance on the part of the city of a great outlay of money for equipment. The continuation school seems to be the only solution.

Schools now open their doors to children in the evening; but evening instruction for the child between 14 and 17 is not effective when he is fatigued in will and body. Primarily evening schools should be for

young men and women, for those who know what they want through the hard school of experience. No note of disparagement is intended of the value of evening schools for those who are old enough and physically developed enough to do the work. But the pace of the modern shop or department store makes it hard indeed for the growing boy or girl to do good evening school work after a long, hard day spent at a machine or at a bundle counter. Germany has largely superseded her evening schools for young apprentices by the more effective day continuation school. England has built practically her entire scheme of industrial education upon the evening-school phase and is now seeing her mistake.

Signs are already indicated on the horizon that compulsory education laws will be so amended, developed, and extended as to include much more than age maturity. The agitation for a change of procedure is strong in such progressive States as Illinois, Ohio, New York, and Massachusetts. These schools will therefore be compulsory. They will continue the education of those who go to work until they are 16. The common branches will be taught and a decided effort will be made "to keep control of children through this trying period, to imbue them with correct ideals of citizenship, and to give them vocational guidance and training." The State already has the oversight of hours of labor, of sanitary conditions of the factory, of the use of certain dangerous machinery. If it has these rights, is it not fair to presume that it has the further right of overseeing the mental conditions under which children work and to apply corrective measures?

TEACHERS OF VOCATIONAL SCHOOLS.

Trained teachers are needed for the vocational schools. Some cautious people would postpone the starting of these schools until we have a trained body of candidates from which to draw. At present it can hardly be expected that a thousand people will rush in to be trained when only one hundred positions await them. Even Germany finds that good industrial teachers are scarce. The man who is school trained is said to be theoretical; the ordinary skilled workman is "too heavy." A man may know his trade but be unable to impart the knowledge to a pupil. One such teacher was overheard to remark to a pupil, "Get out of my way; I will plane the piece for you." He was a good workman but not a teacher.

It is probably true that it is impossible for the average normal training school to fit students for teaching in shop positions in the vocational schools unless these students have had shop experience before entering the school or obtained such experience after graduation. Neither will the present methods in normal training qualify graduates to place the proper emphasis on the book work of the vocational schools upon the application to various trades of science, mathematics, and shop accounts.

New York is the first State to undertake definitely the training of teachers for vocational work. It recognized at the start that no one source of supply would be sufficient nor would one particular method of training be advisable. At present there are three State normal institutions, two universities, and two technical institutes

which are training teachers for one or more of the proposed types of vocational schools.

The Buffalo Normal School has an evening training school for the mechanics who desire to fit themselves as teachers. In the fall of 1910 six men entered vocational evening classes and five completed the year's work. Four of these have returned for the second year's training. The second year for the vocational evening classes has opened with a registration of 32 new students. These are all men who are skilled mechanics and are coming to the school for the training in teaching. They appear to be a very intelligent and promising lot of men and the increase in registration over last year is an indication that the work is attracting favorable consideration.

There are now 35 industrial and trade schools operating under the industrial education law, employing 145 teachers. These schools have a day enrollment of 3,370 pupils and an evening enrollment of 2,933 pupils, or a total enrollment of 6,303 pupils. There are 527 other pupils using the equipment, but not enrolled in these schools.

PHILANTHROPIC INDUSTRIAL SCHOOLS.

These schools, as the name indicates, have been founded by private benevolence. They differ widely in methods and management, but the general purpose is the same. Naturally they are apt to be located in or near industrial centers, where the demand for skilled workers and the potential supply are alike large. Being independent units, philanthropic schools can adopt or alter courses of study more easily than can the public schools, and hence they have shown a quicker response to the growing demand for trade training. For perfectly obvious reasons some schools have been founded expressly to meet a specific demand. Others have been established to give, in addition to the trade courses, technical and scientific education. In general these schools aim to give trade instruction in a practical way without demanding much study of other subjects, but some of them include also purely cultural studies in their industrial courses.

Some are maintained entirely on the original foundation; others receive aid from State, city, or individuals. Some are free, some make a nominal charge for tuition, while others receive as tuition fees sums nearly sufficient to support the institution. Some give trade preparation, some continuation education, while others give training which takes the place of one, two, or three years of apprenticeship, while others aim to teach trades in their entirety.

For the purposes of this report it is deemed expedient to give a brief description of schools which typify six kinds of activities, which are the leading exponents of trade education in the United States and are as follows:

New York Trade School, New York, N. Y.

Williamson Free School of Mechanical Trades, Williamson School, Pa.

The Wilmerding School of Industrial Arts, San Francisco, Cal.

National Trade Schools, Indianapolis, Ind.

Carnegie Technical Schools: School of Applied Industries, Pittsburgh, Pa.

David Ranken, jr., School of Mechanical Trades, St. Louis, Mo.

NEW YORK TRADE SCHOOL, NEW YORK, N. Y.

The New York Trade School is an independent endowed institution which provides day and evening trade instruction to beginners and to men already employed at trades. The school was founded in 1881, and regards itself as the pioneer in trade-school instruction in the United States.

The system instituted by the founder combines both theoretical and practical training and aims to send forth the pupil equipped with a knowledge of the theory as well as the practice of his trade, however, it does not guarantee to make a finished workman, but believes that subsequent practice will supply skill and speed needed for a finished workman.

The trades taught and the pupils in each in the day school are as follows: Plumbing, 84; electrical work, 33; painting and decorating, 4; sign painting, 5; cornice and skylight work, 7; bricklaying, 14; carpentry, 11; steam and hot-water fitting, 14.

In the evening classes the enrollment is as follows: Bricklaying, 25; plastering, 13; plumbing, 199; electrical work, 106; pattern making, 10; painting and decorating, 20; blacksmithing, 9; printing, 28; sign painting, 21; cornice and skylight work, 61; steam and hot-water fitting, 24. Young men who can read and write and who are at least 17 years of age may enter the day or evening school. The maximum age at entrance varies from 22 to 25 years according to the trade. In only one course, cornice and skylight work, is previous trade experience an entrance requirement.

All pupils must register for a full term. Except for excellent reasons entrance must be made when the classes are formed. Practically all of the pupils in the evening school are employed during the day in the trades which they are taking.

The length of the day course for each trade is 16 weeks, except for steam and hot-water fitting, which covers 12 weeks. Classes meet every day from Monday to Saturday, inclusive, from 8.30 a. m. to 4 p. m., with one hour's recess at noon. Classes on Saturday close at noon. The school year opens in December and closes in March.

The evening school year extends over a period of 26 weeks from September to March. The course for steam and hot-water fitting covers two years; for other trades three years are required. Sessions are held Mondays, Wednesdays, and Fridays from 7 to 9.30 p. m. In the plumbing and cornice and skylight-work courses the large classes necessitate extra sessions on Tuesdays, Thursdays, and Saturdays for first-term pupils. Legal holidays are observed as well as a recess of 3 days at Christmas.

In the day classes the periods per week for theory and for shop-work are divided as follows: Electrical work, 3 hours theory, 33 hours shop practice; painting and decorating, bricklaying, cornice and skylight work, carpentry, $1\frac{1}{2}$ hours theory, $3\frac{1}{2}$ hours shop practice; steam and hot-water fitting, sign painting, and plumbing, $3\frac{1}{2}$ hours theory, $3\frac{1}{2}$ hours shop practice.

In the evening school, theory and shop practice are divided as follows: Electrical work, 1 hour theory, $6\frac{1}{2}$ hours shop practice; in sign painting, steam and hot-water fitting, and plumbing, $\frac{3}{4}$ hour theory, $6\frac{1}{2}$ hours shop practice; for the remaining trades, $\frac{1}{2}$ hour theory, 7 hours shop practice.

Theory in both schools includes drawing, either free-hand or plan, lectures, and examinations.

Pamphlet text-books and typewritten sheets are furnished without charge to the pupils. No other textbooks are used. There is a reference library connected with the school for the pupils.

For the completion of each term's work an "award of merit" is given to undergraduates. A certificate, in which is stated the successful completion of any course and a satisfactory examination in both the theory and practice of the trade studied, is awarded each graduate. In the day classes it is stated that between 97 and 99 per cent receive certificates. In the evening school 80 to 85 per cent receive certificates.

Twenty-seven teachers are employed. All teach both the theory and practice of their trades. Two reported education in technical schools; four reported secondary education in high schools. All had practical shop experience in their trades. The teachers are selected because of their reputation as all-round competent workmen who have the ability to teach. The educational qualifications are not considered unless the shop ability of the teacher has been accepted as satisfactory.

WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES, WILLIAMSON SCHOOL, PA.

The Williamson Free School of Mechanical Trades, in Delaware County, Pa., an independent day trade school founded and endowed in December, 1888, was opened in 1891. Its purpose as stated by the founder is to afford an opportunity for poor and deserving boys to receive the rudiments of a good English education, a training in habits of industry and economy, and instruction in mechanical trades or handicrafts, so that they may be able to support themselves by the labor of their own hands and become useful and respectable members of society. He also stated that the general abandonment or disuse of the system of apprenticeship made necessary the establishment of such an institution to afford an opportunity for industrial education which the public schools or other institutions failed to provide. He further stated that in place of a respect for the dignity of labor there had grown up a false belief to the effect that manual labor is not respectable, which belief had sent young men into already crowded professional pursuits in which they had but slight chance of success, and in which failure resulted in idleness, beggary, and crime.

By the terms of the foundation deed the benefits of the school are entirely free. These include boarding, instruction, clothing, etc., during the entire course.

The curriculum of the school is planned to teach thoroughly the five trades listed below and to equip graduates, in so far as a school may, as journeymen mechanics. In its shop practice the school covers all the work of the usual apprenticeship.

The trades taught and the pupils enrolled in each for 1909-10 are as follows: Bricklaying, 55; carpentry, 54; stationary engineers, 27; machinist, 54; pattern making, 42.

These pupils have been assigned to the various trades by the trustees, who are enjoined to consider the taste and adaptability of each candidate. A candidate is given an opportunity to name from

the trades taught the trade which he desires to learn, and if there is a substantial reason for the choice and it is possible to grant it, he is assigned to that trade. If it is not possible to consider the choice, another trade is offered. If this is declined, the name of the candidate is removed from the list.

The selection of candidates is governed by the three following factors: (1) Financial conditions, (2) place of birth, and (3) ability to pass the entrance examinations. Preference is given to indigent boys. In the matter of place of birth preference is given in the following order: (1) Philadelphia, (2) Bucks County, Pa., (3) Montgomery or Delaware County, Pa., (4) elsewhere in Pennsylvania, (5) New Jersey, (6) elsewhere in the United States. Candidates must be able-bodied, healthy males, 16 and under 18 years of age.

Applications from boys of at least 15 years of age are received and recorded for action later. Applications must be signed by the parents or guardians. A certificate of the date and place of birth of the candidate is required.

Candidates are required to pass an academic and a physical examination. One important requisite of admission is a statement to the effect that the candidate expects to follow the trade learned in the school.

Admissions are made in April, and pupils are placed on probation for four months, at the conclusion of which, if satisfactory, they are indentured to the trustees for three years. This indenture may be canceled for good and sufficient reasons. In exceptional cases boys may be admitted to fill vacancies which occur in the first month, but otherwise no pupils are admitted after April 1.

In addition to the regular trade pupils there is a class of "reserve boys" who, while desirable in every other way, have failed to pass the academic entrance examination. About 20 such boys are given an opportunity to receive nine hours per week of academic instruction in order to make up the deficiencies of their education. They are supported by the school and in return are required to assist in the care of the shops and of the household. If, at the end of the year, they successfully pass the examination and have proved satisfactory in conduct and work, they are admitted as regular trade pupils.

The course for each trade covers three years. During the first 2 years 20 hours per week are given to school and 20 to shop work; for the first 4 months of the third year there are 20 hours of school work and 23 hours of shop work; during the remainder of the third year there are 43 hours per week of shop practice, with a limited amount of academic work in addition in evening classes.

The periods for the regular academic work are in the day classes 60 minutes in length; in the evening classes for seniors the periods are 90 minutes each. In subjects in which there is laboratory work and in mechanical drawing several periods may be consecutive. The subjects for all pupils except stationary engineers are as follows:

First year.—Grammar, geography, physiology and hygiene, literature, history, music (vocal), arithmetic, mechanical drawing.

Second year.—Grammar, literature, music (vocal), arithmetic (mensuration), algebra, chemistry, physics, mechanical drawing.

Third year.—First four months, algebra, geometry, trigonometry, chemistry, physics, commercial forms, strength of materials, mechanical drawing; and for the remainder of year in evening classes, trigo-

nometry, strength of materials; and for machinists and pattern making the theory of the steam engine, in addition.

Stationary engineers in the first year take practically the same course as the other pupils except that one hour given to the subject of the steam engine leaves one period less in mechanical drawing. In the second year they take grammar, literature, music (vocal), arithmetic (mensuration), algebra, chemistry, physics, steam, steam boiler, steam engine, steam heating, ventilating, and mechanical drawing.

In the third year during the first four months the subjects are algebra, geometry, trigonometry, physics, alternating current, direct current, refrigeration, steam, gas and gas engine, mechanical drawing, chemistry, and commercial forms. During the remainder of the year the subjects are trigonometry and strength of materials, taken in evening classes.

The shops are completely equipped with tools and machines. The effort is made to give as many practical problems as possible.

The school and shop classes are in session from 8 a. m. to 12 m. and from 1 to 5 p. m. from Monday to Friday, inclusive. The third-year pupils have shop practice also on Saturday from 8 to 11 a. m., and during the last seven months have 1½ hours of academic work two or three evenings per week. The term opens in September and closes on July 31, the school year consisting of 46 weeks. Pupils are graduated in March in order to be prepared to accept or to seek employment at the opening of the season in the building trades. There is a 10 days' recess at Christmas.

A diploma is given on the completion of the course, which states that the pupil has completed his apprenticeship in his trade, including a course of practical and theoretical instruction therein, in trade drawing, and also in the usual branches of a good common-school English education. No certificate or statement is given for a partial course. About 80 per cent of the pupils receive a diploma. Pupils who withdraw before the completion of the course are usually those who fail to show sufficient application to their work.

No textbooks are used for the theory of the trades. A series of shop talks are prepared for each trade. The classes meet in a room adjoining the shop for this instruction, which precedes each exercise or set of excrcises in practical work. A reference library and trade magazines are at the disposal of the students for supplementary information regarding their work.

There are seven instructors, one of whom teaches mechanical drawing and the remainder the practical work of their respective trades. The director of the shopwork holds a degree in mechanical engineering, five are graduates of the Williamson School, and all but one have had practical shop experience. The positions are considered desirable, and there is a waiting list of applicants. The director of the school has prepared a series of shop talks, or outlines for each trade. None of the others has done any original work in the preparation of textbooks.

The property of the Williamson School consists of 24 buildings, located on 230 acres of ground. The eight buildings used for trade purposes are valued at \$115,000 and the industrial equipment at \$51,000. No outside financial assistance is received by the school, the sole support of which is the income from the endowment fund of

\$1,575,812. All schoolbooks and apparatus are furnished free of charge. In 1909-10, \$5,800 was expended on materials for shop practice.

The product of the school is not sold; it is up to the commercial standard and is used in so far as it is available to repair, improve, and extend the buildings and equipment. Some of the buildings have been erected by the students. Throughout all practical exercises the pupils are continually impressed with the fact that no interference with the outlined course will be permitted in order either to expedite or facilitate work, or to make undue use of any ability or skill of individual pupils. The school constantly emphasizes the fact that a commercial object in its work would result in keeping pupils on such processes as they could best execute, and, consequently, would either retard or arrest their development, which can be reached only by thorough knowledge and skill in all the phases of their trade.

In the foundation deed the following is stated in reference to the status of the pupils of the Williamson School: "All scholars admitted to the school shall be bound as indentured apprentices to the trustees."

WILMERDING SCHOOL OF INDUSTRIAL ARTS, SAN FRANCISCO, CAL.

This school was founded in 1894 by the will of a San Francisco merchant. Under the will \$400,000 was bequeathed to the regents of the University of California "to establish and maintain a school, to be called the 'Wilmerding School of Industrial Arts,' to teach boys trades, fitting them to make a living with their hands, with little study and plenty of work."

After mature deliberation the regents resolved to cooperate with the California School of Mechanical Arts, to avoid duplication of work in the two schools. They acquired lands and erected buildings near by. An advisory board consisting of four members is chosen by the regents of the University of California. The first class was admitted January 8, 1900, and subsequent classes have been organized at intervals of six months (July and January) of each year.

The school is open to "any earnest, industrious boy who wants to learn one of the building trades as an integral part of his education and preparation for life." It aims, however, to give something more than the mere equivalent of a workshop apprenticeship. Its graduates must have a fair command of the English language; they must know enough of mathematics, drawing, and science to insure intelligent and progressive workmanship.

Any boy who has completed the grammar grade is eligible for admission. Boys who have finished only the seventh grade will be admitted provided they are 16 years of age or over; the maximum age of admission is 21 years.

The enrollment for the various courses is as follows: Carpentry, 15; bricklaying, 8; plumbing and tinning, 24; electrical work, 60; cabinetmaking, 16; trade not yet determined, 60.

The school also has a class in architectural drawing. The length of the school year is 40 weeks. The hours of attendance are from 9 a. m. to 12 m. and from 12.45 to 4 p. m., Monday to Friday, except on Wednesday, when the afternoon session closes at 2.15. The daily program includes eight periods of 45 minutes each. During the first two years four periods per day are spent in the shops and four periods

are devoted to academic instruction. During the last two years the academic instruction is gradually discontinued.

The academic subjects consist of English, mathematics, science, drawing, and history.

A student may select his trade immediately upon entering school, or he may defer selection for a period not exceeding two years. Whenever he begins his trade course he devotes all of his shop time to his chosen trade.

If he chooses to defer selection of a trade, his preliminary course must include the regular academic subjects and must not include more than two lines of shopwork at one time. He may change from one industrial department to another or he may begin a regular trade course at the beginning of a new term (July or January). Boys are encouraged to take some preliminary work in order to determine for what trade they have the greatest adaptability.

The trade practice teachers are men of experience both in the commercial practice of their trade and in teaching.

The school furnishes all materials, and all products are the property of the school. The pupils may buy articles they have made at the cost of the materials.

A certificate showing work done is given pupils who have completed at least two years' work, and a diploma is given upon completion of four years' work. About 20 per cent of pupils finish the four-year course.

NATIONAL TRADE SCHOOLS, INDIANAPOLIS, IND.

Agitation for the establishment of a trade school at Indianapolis was begun in 1903, and in March, 1904, the grounds of the United States arsenal were purchased with funds raised by popular subscription among citizens of Indianapolis and the friends of the Winona movement. In April, 1904, the Winona Technical Institute was incorporated, and in September of the same year it was opened with departments of pharmacy, chemistry, electrical wiring, and a little later lithography and house and sign painting were added. Other departments have been added from time to time.

The school has for its purpose the teaching of the trades. On the assumption that no trade can be taught thoroughly without the actual shop conditions of commercial work, opportunity is given for shop practice on commercial work. This work is secured through the interest of manufactures who are willing to intrust parts of their own contracts to the school. While the school plans to give the pupils as much of this commercial work as possible, no work may be undertaken at the expense of the regular course of instruction.

The school has been national in character, and in reaching decisions as to what subjects should be taught the authorities of the schools have conferred with the advisory boards of the various national employers' associations and with any other bodies directly interested. An arrangement with several machine manufacturers gave the boys an opportunity to put in a part of their time working in commercial shops.

In 1909 the school became so involved financially that it went into the hands of a receiver, who, at the time the school was visited, was engaged in reorganizing the school and reconstructing its policy.

It is expected to pass under the direction of the public-school authorities of Indianapolis, in which case it is proposed to levy a tax on the city of 3 cents on the \$100, yielding an income of approximately \$60,000 annually.

Under the reorganization an extensive cooperative scheme is to be introduced, whereby pupils will have an opportunity to earn a part of their maintenance while in school, as well as to get commercial shop practice.

Any boy 16 years of age or over, who desires to learn one of the trades taught is accepted as a pupil. The school prefers, however, to take no boy under 18 years of age, on the ground that younger boys are too immature to grasp the work. It is preferred that the pupils enter at the beginning of a term, but they are received at any time during the year, provided there is a vacancy and that their entrance does not interfere with class work of other pupils.

The trades taught are lithographing, printing, molding, machinists, bricklaying, tile and mantel setting, carpentry, painting and paper hanging, and pattern making. Courses in pharmacy and chemistry are also provided.

The year 1909-10 was hardly a normal year in point of attendance, since, because of financial uncertainty, some of the courses were not given. The attendance in each course was as follows: Lithographing, 44; printing, 93; molding, 29; bricklaying, 11; machinist, 25; tile and mantel setting, 13; carpentry, 1; and painting and paper hanging, 2. The number taking pattern making was not reported.

The years in the courses vary. Printing, lithographing, molding, machinist, pattern making, and carpentry have in the past offered a two-years' course; painting and paper hanging a one-year's course; bricklaying, three-fourths year's course; and tile and mantel setting one-half year's course. Under the plan of reorganization the program in some departments will be materially changed.

The amount of time devoted to the theoretical side of the trade differs widely in the different trades. Painting, bricklaying, carpentry, and pattern making offer no strictly theoretical work; the other trades offer theoretical courses varying from 2 to $15\frac{1}{2}$ hours per week.

In the lithographing course pupils in the first year devote 9 hours to theory and in the second year $15\frac{1}{2}$ hours to theory and get practical work in every branch of the trade, beginning with the rudiments of drawing on paper and stone, preparations of stones and plates, lettering and engraving, transferring, proving, and printing, and then moving through the various stages to the final production of the work on flat-bed and rotary lithographic presses.

The department of lithography does all of the lithographic work for the school and in addition does as much commercial work as can be handled. Many of the machines have been donated by manufacturers of lithographic machinery.

The course in printing covers a preparatory course for pupils who have had no experience in printing, in which the rudiments are taught and attention is given to the simpler forms of composing and press-room work, and a junior course for pupils who have had one or two years' experience in printing, and covers ordinary display hand composition and presswork up to the more advanced composition, impo-

sition, and presswork; and a senior course for pupils in the branch of printing for which they are best fitted. There is also a linotype course of eight weeks; pupils who have had no previous training in hand composition are required to take a short preparatory course in the composing room before entering the linotype course. Three hours per week are devoted to the theoretical side, history of printing, typography, and shop talks. In addition to the regular machine-operator instruction pupils receive sufficient training to be able to take care of and repair the linotype machine. The school is equipped with power presses, linotype machines, and type for hand composition.

The school of tile and mantel setting occupies a two-story building. The space is cut up into booths, where each pupil has practice in tile laying and mantel setting. All of the tile work about the institution in lavatories, halls, etc., is done by the pupils. Actual working conditions are reproduced as nearly as possible, and practice is given in every branch of the trade. One hour per week is given to history of the manufacture and use of tiles and one hour to shop talks.

In the course in bricklaying, indoor practice is given in the various branches of the trade; pupils frequently have an opportunity to go outside of the school to work on buildings for pay. No time is given to theoretical work, except as it is incidental to practice. Fifty-two hours per week are given to shop practice.

In the machinist's course the pupils in the first year devote 7 hours per week to the theoretical side, covering applied mathematics, mechanical drawing, and shop talks; in the second year 8 hours are given to machine design. Thirty-seven hours per week during the first year and 36 per week during the second year are devoted to practice.

In the foundry, which prepares for the molding trade, 12 hours per week are given to theory covering chemistry, mechanical drawing (first year only), and shop talks, and 40 hours per week are given to shopwork.

Pupils in painting and paper hanging give all of the time, 48 hours per week, to practice. They get considerable practice by doing the work of the institution and through the cooperation of the master painters of Indianapolis they get some commercial work.

The carpentry course combines the theory with the practice work, which covers 52 hours per week. The shop is well equipped with tools and the work in the shop is to teach the fundamentals of the trade and to give the pupil a chance to learn the various uses of commercial machines used in the trade and the methods of "getting out" various parts of material in house construction.

Later in the course the pupil is taught how to lay out and construct centers and window frames; make, case, and hang doors; lap beams and set bridging in them; erect stud partitions and lay flooring. In addition, house construction is taught. The course is aimed to give each member of the class a varied amount of shop and construction work. In connection with this department a course in joinery and a course in practical pattern making are given. Patterns are made for the foundry department.

In addition to the above courses there is a school of pharmacy, where a course in pharmaceutical chemistry fits boys for work in industrial chemistry and in manufacturing chemists' establishments.

The tuition fees vary in the different departments according to length of term and the instruction given.

Pupils in the molding, printing, lithographing, machinist, and carpentry trades are required to deposit \$5 for tools, which amount is restored to them if they return all tools in good order. Each pupil in the tile and mantel setting, painting and paper hanging, and brick-laying trades must purchase a set of tools.

In each department there are a number of scholarships provided by manufacturers' associations for pupils who are unable to meet the tuition. The scholarship amounts to a loan, which is to be repaid by the pupils within five years after graduation.

School is in session throughout the year. The majority of the several departments are in session from 8 a. m. to 5 p. m., with an hour at noon, Monday to Friday, and on Saturday, 8. a. m. till noon.

Comparatively few textbooks are used, the most of the work being practical shopwork. For reference books the various trade journals furnish the chief supply. In addition, there is a reference library at the disposal of the pupils.

A diploma stating course taken and kind and grade of work done is given for completed courses. Certificates stating merely the amount of work done are given for fractional courses. It is estimated that at least 40 per cent of the pupils leave before the completion of a course. In some cases they have completed some specific branch of it; in others they have merely gained information enough to enable them to get a job.

During 1909-10 fourteen trade teachers were employed. Practically all of them were men from the trades and were in general nominated by the National Manufacturers' Association. Most of the teachers had had little or no teaching experience prior to that at Winona, but had had from 5 to 30 years' experience as mechanics. There has been little trouble in retaining teachers.

Labor unions in the past have been hostile to the institution, but under the new management there probably will be some cooperation of the trade unions with the authorities of the school.

Under the régime of the Winona assembly there was a board of 50 directors; seven were ministers, two were attorneys; the rest represented various manufacturing interests throughout the country; each department had an advisory committee from the employers' organization of the trade it teaches. The reorganized board is planned to have nine members, two of whom are to be appointed by the governor of the State; two, one of whom must be a labor man, by the mayor of Indianapolis; one by the commercial club of the city; one by the board of trade; one by the merchants' association, and two by the school board.

The grounds and buildings purchased from the Government were valued at \$29,990.34. Since that time the foundry building, costing \$10,090.55, has been added. The present working outfit of all departments is valued at \$135,000, of which an equipment valued at \$85,000 was furnished by the institute, and an equipment valued at \$50,000 was furnished by various manufacturers' organizations.

During the past year employers' associations have given \$11,623 toward the support of the school; and \$5,857 more was given by local employers and by other people interested, while additional funds were made up by tuition fees, etc.

The machine shop, foundry, printing, lithographing, and pattern-making departments make a marketable product. For the past year receipts from the output were approximately as follows: Foundry, \$18,000; printing, \$6,000; lithographing, \$3,000; machine shop, \$7,200; pattern making, \$5,000.

This work is almost entirely order work. No work is done for the open market, but is made up as ordered.

Pupils engaged in commercial work are paid for their time. In the foundry department boys are paid 8 cents per hour from the start, advancing 1 cent per hour each quarter until the course is completed. They earn from \$4.20 to \$12 per week. In the machine-shop department they work piece rate and earn from \$3 to \$10 per week. In the printing and lithography departments earnings are very irregular.

The unions have agreed to support the reorganized National Trade School on condition that neither employers nor workmen will in any way involve the school in disputes between capital and labor, that the employers will not use the school as a strike-breaking institution, that the school will not allow its pupils to go to any place where a strike is under way for the purpose of breaking the strike, and that if any pupil shall do so he will be debarred from ever returning to the institution.

CARNEGIE TECHNICAL SCHOOLS: SCHOOL OF APPLIED INDUSTRIES,¹ PITTSBURGH, PA.

This school is a part of the Carnegie Technical Schools. A tender of the money with which to establish technical schools for both sexes was made to the city of Pittsburgh in 1900, on condition that the city provide a site of ample size for future extension. In compliance with this stipulation a tract of 32 acres of land adjoining Schenley Park, near the Carnegie Library and Institute building, was purchased by the city in 1903 as a location for the schools. The first group of buildings was completed and opened to pupils in October, 1905, additional departments being organized as new buildings were made ready for occupancy. Funds for buildings and equipment have been supplied by the founder as needed from time to time, in addition to which he has increased his original gift of \$1,000,000 to a present endowment of \$7,000,000.

In the School of Applied Industries young men who desire to enter industrial work are assisted to select a congenial trade and are given practical instruction not only in that trade but in the closely allied subjects, thereby preparing them to start in as competent workmen who are soon able to obtain recognition as journeymen. Older men who are already engaged in a chosen trade may obtain in the school such additional information relating to their work as will increase their efficiency and consequent earning power. Special emphasis is placed on the fact that, besides the possession of mere skill, it is essential for a man to concern himself with right living and good citizenship in order to be permanently successful.

The school is open to both day and evening pupils. The day courses are offered primarily to meet the existing demand for proficient men in the machinery and building trades, where a reason-

¹ Formerly School for Apprentices and Journeymen.

able amount of technical information and trained intelligence is essential. Two courses are given in the day school—a regular industrial course extending over two or three years according to the ability and progress of the pupil, and a short course which may be finished in one school year. The regular course is intended for young men who present evidence of good scholarship, but who lack practical experience and whose age warrants the expenditure of time to lay a broad foundation for trade work. It deals with the sciences fundamental to all trades and includes practice in the various shops. Its aim is to carry a young man through the fundamentals of a selected trade and at the same time to give him practical instruction in subjects which are closely related to the trade. The short course is for men of maturer age who possess considerable experience in a trade and who desire to confine their efforts to improving themselves in that trade only, with a minimum amount of attention to related subjects. It is particularly advantageous to young men approaching their majority who have served the larger part of their apprenticeship and who wish to enter the field of skilled labor with more training than the shop generally gives to an apprentice. A course for teachers, designed to meet the growing demand for men to take charge of departments in manual training and trade schools, is also offered.

The opportunities for employment in the vast iron and steel industries of Pittsburgh and vicinity determine to a large extent the nature of the school. The subjects taught have been selected by the faculty after a careful consideration of what is needed to satisfy the demand for skilled workers in the local field, where a phenomenal development of the manufacturing and building industries has occurred in recent years. On October 28, 1909, the enrollment by trades in the regular day course was as follows: Bricklaying, 10; electric wiring, 44; forging, 3; foundry work, 8; machinists, 36; pattern making, 14; plumbing, 14; stationary engineers, 18. In addition, 82 boys were receiving instruction in mechanical drawing only, much of which was closely correlated with trade work. On the same date there were 7 advanced pupils who were taking the full machinist's course in one year, and 3 advanced pupils who were taking the full plumbing course in one year, with 6 pupils in the short drawing course.

All applicants for admission to the school are subjected to a personal interview in order to discover their adaptability to the course selected. Applicants are either approved or disapproved as a result of this interview, but an applicant who is not approved may be admitted on probation for one term, after which he is dropped unless a creditable standing in his studies has been made. Candidates for admission are also required to submit letters from teachers in high or manual-training schools which they may have attended, or letters from previous employers giving evidence of experience in shop or trade work. There is no fixed age limit on school entrance. It is recognized that some vocations demand more maturity than others. Two factors govern in determining the age at which an individual pupil may be admitted: First, the amount of preparation that the applicant has acquired in other schools; and, second, the character of the environment he must face on leaving the school. Sixteen years is regarded as the earliest age at which a pupil can fully appre-

ciate the responsibility and the intensity of his work, and this is usually accepted as the minimum for school entrance. No maximum age limit has been fixed. In the short course, except in rare cases, applicants must be at least 20 years of age. Pupils are received at any time during the school year, but are encouraged to enter at the beginning of the term. As a rule no work for wages outside the school is done by day pupils during the school year. During vacation periods, however, pupils are encouraged to seek employment in lines of work similar to the courses pursued in the school. A bureau organized especially for that purpose assists pupils and graduates to obtain congenial employment.

The theoretical subjects for study in the regular day courses are chemistry of materials, drawing, English, mathematics (including arithmetic, algebra, plane and solid geometry, and plane trigonometry), principles of mechanism, and estimates and cost. In addition, pupils devote about one hour per week during a part of the school course to a study of the laws of hygiene. Pupils taking the short course have instruction in mechanical drawing and mathematics. In the regular courses the time given to theory and to practice work varies greatly among the different trade subjects and the different stages of each course. For stationary engineers the preponderance of time is given to theory throughout the entire course, while in other trades, as bricklaying and plumbing, practice work receives the greater attention after the first term. For machinists, pattern making, forging, and foundry work the aggregate time devoted to shopwork during the course only slightly exceeds that given to theory. In the two short courses taken by pupils in 1909-10, viz, machinist and plumbing, 8 hours were devoted to theory and 22 hours to practice during each week.

In the day school the regular hours of instruction are from 9 a. m. to 5 p. m., with one hour for luncheon, from Monday to Friday, inclusive, but individual pupils are not required to remain during the entire time the school is in session. No pupils have less than 30 hours per week, while some have as much as 34 hours, depending on the course taken. The school year was originally divided into two terms of 15 weeks each, from the 1st of October to the middle of May, approximately. In 1909-10 the school was in session 32 weeks and in the future the school year will embrace 34 weeks. No summer term is provided. Two weeks of vacation are given pupils at Christmas and the usual legal holidays are observed.

Graduates from the regular course, either day or evening, receive a certificate of graduation from the school. Pupils who complete any portion or all of the work of the short course are given a letter by the dean of the school, setting forth the work done and the proficiency attained. About 35 or 40 per cent of pupils are reported as leaving school before the completion of their courses, the greater number of whom drop out during or soon after the first year. Most of the withdrawals are occasioned by the obtainment of employment by pupils.

During the year 1909-10 there were 21 teachers who gave trade instruction in the day course. Of these all but 1 taught the theory of a trade, while 12 of the number were instructors in shopwork. In addition there were 2 teachers of English, 1 of whom taught specifications and contracts. Of 20 teachers of trade subjects, 17

had attended other than common schools, 16 had practical experience in the trade taught, and 18 had previous experience in teaching the trade. Five teachers reported experience in supervisory school work.

In common with the other units of the Carnegie Technical Schools system the School of Applied Industries is under the board of trustees of Carnegie Institute. A committee from the board has general supervision over all matters pertaining to the school's management and control. The officers of administration of the four Carnegie technical schools are the director, secretary, registrar, the dean of each school, the bursar, the supervisor of equipment, and others. The practical administration of the affairs of the four schools is in the hands of this body.

The income of the school, both day and evening sessions, from all sources in 1909-10 was about \$75,000, the major portion coming from the general endowment fund provided by the founder. In the day school the tuition fee to residents of Pittsburgh is \$20 per annum and to others, \$30. In addition, a general fee of \$10 is collected to defray partly the cost of instructional material, the depreciation of laboratory and shop apparatus, and incidental supplies. A breakage deposit of \$3 is required of each pupil, the unused portion of which, less 50 cents for locker rental, is returned at the end of the year. Pupils are required to furnish their own schoolbooks, but are permitted to take out without charge for home use circulating volumes from the Carnegie Library, which is located but a short distance from the school.

Approximately \$13,000 were expended for materials used in trade instruction in the day and night schools during the year 1909-10. Nothing that is produced in the schools, however, is offered for sale, the articles manufactured, such as hand tools, patterns, castings, cabinetwork, etc., being either applied to school use or reduced to stock. A number of power machines built by pupils are in every-day use in the school shops.

The regular day course has been arranged primarily to meet the needs of young men who desire a broad industrial education in order to equip themselves for positions as foremen, inspectors, assistant master mechanics, assistant superintendents, etc., in the manufacturing and building trade industries. At the same time the executive side of the instruction is not stressed, the aim being to direct pupils into the skilled manual vocations, where in course of time they may rise to higher positions, rather than to prepare them for such positions immediately. The short day course and the evening courses are primarily for improvement in the trade selected or followed by the pupil. Graduates from these courses are soon able to do the work of journeymen. No difficulty in obtaining positions is experienced.

EVENING SCHOOL.

The evening courses are intended primarily for those who are working at a trade. In the formation of classes preference is given to men already at work, as it is recognized that they are in a position to make the best use of the instruction given. The usual time required to complete a course is four years, but advanced pupils finish a four-years' course in two years. Stationary engineers have three years of instruction and painters have two years.

The regular evening courses were opened January 7, 1906. The enrollment by trades on November 7, 1909, was as follows: Brick-laying, 21; electric wiring, 55; forging, 19; foundry work, 19; heating and ventilating, 9; house painting and graining, 8; machinists, 67; pattern making, 28; plumbing, 74; sheet-metal and cornice working, 25; sign painting, 24; stationary engineers, 23. In addition 80 pupils were studying mechanical drawing only.

The curriculum of shop practice followed in the evening school is identical with that of the day session, as far as the limited time will permit. At the same time, in the arrangement of evening courses a considerable amount of practice work by the pupil in his daily vocation is presupposed.

The school is in session five evenings each week, from Monday to Friday, inclusive. The school year, containing 26 weeks, usually begins on the second Monday in October and ends on the last Friday in April. Thirty-one teachers were employed in 1909-10. Of these, 28 were teachers of trade subjects, either theory or practice, or both. A majority of these teachers also gave instruction in the day school.

DAVID RANKEN, JR., SCHOOL OF MECHANICAL TRADES, ST. LOUIS, MO.

This institution was endowed and established in 1907 and opened in 1909. It was founded on the assumption that the public schools and other educational institutions not only had failed to provide training in mechanical trades, but had tended to draw boys away from the consideration of them by the creation of a prejudice against manual labor. Boys who could have succeeded as mechanics were in consequence caused to engage in pursuits either already overcrowded or for which they had no aptitude. The founder believed that there was a need of an institution to provide education in the ordinary mechanical trades and to inculcate an appreciation of the dignity of labor. He stipulated that the trades taught should be those in which there is a demand for practical workmen in the community and in the State.

The institution has three separate schools—a day school, an evening school, and a day cooperative school. The institution aims to give the boy without experience training similar to that received by the apprentice, to give the apprentice such instruction as will round out his shopwork, and to give the journeyman information concerning his trade that is not given in his shop. It also aims to secure the cooperation of manufacturers who acknowledge the limitations of shop instruction and who will send their apprentices to the school to study the theory of their trade.

For admission to the day or evening school candidates must be white males, 15 years of age or over, who have completed the sixth grade of the public schools or its equivalent. An exception is made in the day school for the admission of boys 14 years of age who have completed the work of the sixth grade of the public school or its equivalent and who are physically qualified for the work and show particular aptitude for trade instruction. All applicants must be in good physical condition and furnish a certificate of good moral character. Any applicant who has had trade experience but who lacks the educational qualities may make up the latter in special classes formed by the schools for preparatory instruction.

In the day school the trades taught and the number enrolled in each in January, 1910, were as follows: Carpentry, 15; bricklaying, 7; plumbing, 19; painting, 6; stationary engineers, 6. Pattern making is included in the list of trades offered, but as yet no pupils have elected it.

In the evening school the enrollment was as follows: Plumbing, 40; carpentry, 9; bricklaying, 10; painting, 10.

In the cooperative school 30 machinists' apprentices studied mathematics and drafting.

The full courses for the day and evening schools have not yet been formulated. Some changes are in progress by which the theoretical work, which covers drafting and mathematics, will include elementary science and building theory. Day-school courses cover two years, but are to be extended to three years. The evening-school courses are indefinite.

Drafting and mathematics require seven hours each per week in the day school. These subjects are required of all day pupils, but are elective by the evening pupils. If elected, two evenings of two and one-half hours each are devoted to them. Pupils may elect shop practice for two or four evenings, may take two evenings for practice and two for theory, or may elect theory alone for two evenings.

The shops are well equipped with tools and materials for the various trades.

The school year for day pupils covers a period of 46 weeks, extending from September to August. The year is divided into three terms, beginning in September, January, and April, respectively. The evening-school year covers two terms of 12 weeks each, beginning in October and in January.

Day-school sessions are held from 8.20 a. m. to 12 m. and from 1 to 4.40 p. m. from Monday to Friday, inclusive. On Saturdays the sessions are from 8.20 a. m. to 12 m. Evening classes are held from 7.30 to 10 p. m. from Mondays to Thursdays, inclusive.

As the trade instruction is almost entirely individual, pupils, except those who are taking the stationary engineer's course, may enter at any time. Practically all of the pupils in the evening school are actively engaged in the trade, the theory or practice of which they study in the school.

Nominal tuition is charged, so that pupils will appreciate the opportunity offered and because of some sacrifice to pay for it will take it seriously. The charge for tuition eliminates to a considerable extent an undesirable element that otherwise drifts in and out of schools without a definite purpose of completing any course. The charge for tuition is \$30 per year, or \$10 per term, for the day-school courses. For the evening-school courses \$5 per term for two evenings per week, or \$10 per term for four evenings is charged. Pupils are required to provide their own drawing instruments, paper, and other small incidentals. Tools and supplies in the shops are furnished by the school.

No textbooks are used as yet. A reference library in process of formation contains a few books on technical subjects and some trade magazines. The pupils use drawings and blue prints in connection with their work in the shop.

For a completed course a diploma is given. Upon request a statement of work done and the instructor's estimate of the pupil's proficiency will be given for any partial course.

The decision as to the election of trades rests largely with the superintendent, whose suggestions are subject to approval by the board of trustees.

The board of trustees is a self-perpetuating body of eight members, whose four officers are elected annually. This board annually elects an advisory committee of not more than 15 members. The governor, the attorney general of the State, and the mayor of St. Louis are members ex officio of this committee.

The grounds cover about 3 acres, on which a 3-story brick building, the first of a group, has been erected. This building contains six shops, a drafting room, science room, library, classroom, and offices.

The institution has an endowment fund of \$3,000,000. The building cost \$170,000 and its equipment \$9,000. The expenditures for shop materials for both day and evening classes in 1909-10 amounted to \$5,500, and for janitor service, heat, light, and power to \$3,000. No outside financial assistance is received.

There are seven instructors, all of whom teach in the three schools. Two are college graduates in engineering, one having had five and one six years' shop experience. One of these teaches drafting and mathematics, the other drafting and practical steam engineering. Five instructors, with from 8 to 37 years' experience in their trades as journeymen, foremen, or as men in business for themselves, teach shop practice.

Considerable appreciation of the school has been shown by workmen, by contractors, and by associations of manufacturers, as well as by men and boys employed during the day who attend the evening classes. The attitude of the public in general is favorable to the school, but this attitude so far is merely an expression of good will, since there have been no means as yet of determining its value as a trade institution through the work of any graduate. The employers whose apprentices are in the cooperative classes have expressed themselves as pleased with the results, but as yet this arrangement is in its experimental stage.

INDUSTRIAL EDUCATION FOR GIRLS.

The aim in the industrial education of girls is a double aim, viz: Preparation for an occupation for immediate self support, and Preparation for home life.

These two aims must be kept in proper balance. Any system of industrial education for girls will be inadequate that does not provide for both aims.

Ability to earn money is of such prime importance to the young girl that she has little inclination for domestic life or the training which will be of vital importance to her later in her life.

Since most women who engage in wage-earning industries (as well as others) are at least potentially wives and mothers, training for housekeeping and home management is believed to be an essential part of all their education, whether it be industrial or general.

But since a large proportion of the girls now leaving school at fourteen must prepare to earn their living by industry, the prime interest of the school pupil is likely to center upon training for wage-earning occupations.

The vital importance of domestic education for girls does not change the fact that the progress of such education depends largely upon the sentimental attitude of young people toward this kind of work as a vocation.

A high standard of skill and knowledge of housekeeping in all its branches and details is of such far-reaching effect upon the future of any community that every effort should be made to shape public opinion toward a true appreciation of its importance and dignity.

Women and girls are employed in mechanical occupations connected with very many industries in the country, and these occupations of women are not only affecting industry but the standards of womanhood and the home.

It is therefore of the utmost importance that young girls who must work in shops and factories be trained for occupations which do not prevent development or incapacitate them for future mothers and home makers.

It is believed that much can be accomplished in establishing day and evening schools for domestic science by having the equipments adequately adapted to the requirements. For instance, pupils should learn cooking, housework, and household management in kitchens and rooms in every respect typical of real conditions in homes of various grades of economy and incomes of various amounts. And the girl who wants to become an expert scientific cook or housekeeper should be taught with highly improved and perfected equipment.

If it should be thought by anyone that the comparative importance of industrial training did not depend so much upon the number of workers as upon the character of the work itself, it would seem most reasonable to consider the scientific conditions underlying the nature of good food preparation as influencing right living and good health; also the importance of good housekeeping and wise home management as influencing thrift among our working people and good citizenship throughout the country.

The home training of girls may be accomplished in two ways:

First. By such specific training for this as is compatible with the trade instruction, and

Second. By having trade schools for specific domestic training, with courses both for pupils who may aim to make a wage-earning vocation of housekeeping in all its branches, and for those who wish to become thoroughly prepared to conduct homes of their own.

Such courses would include considerable academic and scientific schooling.

Whichever course is pursued there is sure to follow a very important reaction on the home from the added intelligence, higher ideals and greater earning capacity of the graduate of such industrial schools.

With girls, as with boys, the time in life when general education ceases to appeal to them is between the fourteenth and sixteenth years, and at these ages a large percentage of girls enter the less skilled occupations.

Girls usually remain at work from five to eight years, during which time their social scale, their standard of efficiency, and the type of their future homes are largely determined.

Opportunities for industrial education for girls or even industrial schools that offer industrial courses which aim directly to fit girls for specific occupations are not numerous. However, the interest in

those which have been established is manifested both by a definite movement for the organization of other schools and by their influence on the economic and social problems of wage-earning women. The need of a study not only of the schools, but also of the local industrial conditions under which women work, is essential before organizing industrial schools for girls in any community. Investigations for the opportunities for women in various vocations have been limited in scope, and few in number, but where such investigations have been made the information secured has been exceedingly valuable. In many instances the general conviction that girls should have, or were demanded to have, some vocational training has led to the introduction of dressmaking and millinery, with but little knowledge of the local conditions of work, wages, hours, chances of employment, and opportunities in the industry. It is especially noticeable that dressmaking and millinery are almost the only trade courses offered to girls at the present time.

In schools of the elementary "short-time" type the usual purpose is to prepare girls of the poorer classes to become self-supporting as quickly as possible. The class of pupils for which these schools were established is especially characteristic of the larger cities; a large percentage have not gone beyond the fifth year in the grammar school.

The advanced "short-time" schools are somewhat different in their general characteristics from the other types. The pupils pay a tuition fee, and they are usually older and better able to profit by the instruction given. The school work is offered in courses so that a pupil may take as much or as little as is desired, but these courses are fitted to the actual needs of the pupils for whom they are designed.

The third group of schools offers longer and more theoretical instruction but of a less pronounced trade character than that of either of the above types. Among this latter group are public high schools with day courses for industrial training, whose entrance requirements often include graduation from the grammar schools, and their courses are usually three or four years in length.

The fourth group of schools includes evening schools for women and girls; some of these are public schools and some philanthropic. The courses offered are for girls and women who are employed during the day. Much of the work in them appeals particularly to girls who want it for home use; many of those entering upon such courses do so because of a definite prospect of marriage and are taking it in preparation for housekeeping.

The following schools are representative of the several types mentioned above:

Elementary short-time schools.—Manhattan Trade School for Girls, New York, N. Y.; Girls' Trade School, Boston, Mass.; Milwaukee School of Trades for Girls, Milwaukee, Wis.; Clara de Hirsch Trade School, New York, N. Y.; Pascal Institute, New York, N. Y.; Chicago Girls' Trade School, Chicago, Ill.; Jewish Kitchen Garden Association and Trade School for Girls, Cincinnati, Ohio; Hebrew Technical School for Girls, New York, N. Y.

Advanced short-time schools.—Pratt Institute: School of Household Science and Arts, Brooklyn, N. Y.; Drexel Institute: Department of Domestic Arts, Philadelphia, Pa.; Temple University: Department of Domestic Art, Philadelphia, Pa.; Mechanics' Institute: Department of Domestic Science and Art, Rochester, N. Y.

Public high schools with day courses.—High School of Practical Arts, Boston, Mass.; Washington Irving High School, New York, N. Y.

Evening schools.—New York Evening High School for Women, New York, N. Y.; Cincinnati Evening School, Cincinnati, Ohio; Evening High School for Women, Philadelphia, Pa.; Carnegie Technical Schools: Margaret Morrison Carnegie School (evening courses), Pittsburg, Pa.

SCHOOLS FOR NEGROES.

In any presentation or discussion of the schools for negroes it must be understood that in general such schools embrace two types, i. e., schools that train for industrial occupations and schools that train for the teaching profession. The leading exponent of the latter is Hampton Institute, Hampton, Va., while Tuskegee Institute, at Tuskegee, Ala., can be considered as showing preference for the former. However, the primary motive of either does not in any way preclude the alternative, as each school plans to equip its pupils to become efficient trade workers as well as teachers.

As to the aim of these schools, in so far as girls are concerned the primary purpose is the education of girls to fit them for home makers rather than for trade or industrial occupations.

The few industrial schools for negroes in the North aim to fit almost exclusively for trades or to adapt the negro to the conditions of life in the city.

For the purposes of this report there is presented a description of the two types mentioned above, which amply shows a general educational scheme of each individual type.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, HAMPTON, VA.

Hampton Normal and Agricultural Institute, a school for Negroes and Indians, located at Hampton, Va., stands for varied activities. It comprehends a normal training school, an agricultural school, and a department called the "trade school." The last-named department is the only one which comes within the scope of this report.

Hampton Institute was founded in 1868 for the purpose of providing a practical education for children of ex-slaves. Ten years later, by contract with the Federal Government, Indian pupils (limited to 120) were admitted. These Indians pupils are on a somewhat different basis from the Negroes, being there as wards of the Government.

The institute is neither a Federal, State, nor denominational school. The funds for its maintenance are obtained chiefly from gifts and bequests of private individuals. In 1870 it was chartered by a special act of the General Assembly of Virginia, and thus became an independent organization, controlled by a self-perpetuating board of trustees from various sections of the country, the secretary of this board being the executive head of the institute. The department for trade instruction has no specific bequest, but draws upon the general fund for such financial aid as is needed.

During the year 1909-10, 241 students were enrolled in the trade classes as follows: Twenty-eight blacksmiths, 44 bricklayers and plas-

terers, 49 carpenters, 10 cabinetmakers, 13 machinists, 10 painters, 8 printers, 8 shoemakers, 17 steam fitters and plumbers, 37 tailors, 2 tinsmiths, 1 upholsterer, 14 wheelwrights.

Hampton's primary function is to train up leaders among the Negro race, and the selection of students is made with this end in view. Candidates for admission must be at least 17 years of age and must pass an examination in arithmetic, English, and geography. Before a boy is admitted to the trade classes he must have completed at least one-half the academic work of the "junior" or first-year class. In addition to fulfilling the mental requirements, all applicants for admission to the institution must pass a physical examination and must furnish evidence of good character. No pupils are admitted after the opening date except by special dispensation of the faculty, which is granted only in extreme cases.

Pupils are admitted to the trade classes only as vacancies occur. An applicant for whom there is no vacancy may do one of two things: Enter the regular day school and defer his trade training until the next year, or he may enter the "work class" and obtain his academic instruction in the evening school. This "work class" is for pupils who need to earn money with which to meet expenses later in the course. The work done is not trade work, but any work of the institution, skilled or unskilled, needing to be done that the boy is qualified to do. Pupils usually earn from \$15 to \$20 per month during a "work year."

In addition to this, pupils who are not in the "work class" or trade classes have one day per week on which they work for the institution and are credited therefor. In such cases they work at whatever labor is to be done at the school.

The trade course covers a period of three years. A certificate is given for the completion of the trade course, but no diploma is awarded unless the equivalent of the four years' academic work also has been completed.

When a pupil enters the trade classes he also enters evening academic classes at that point for which his previous schooling has prepared him, and continues this course as long as he remains in school. So pupils of different grades of academic advancement will often be found in the same trade class.

Great emphasis is placed upon the teaching of civics, both in the classroom and in the shop. Constant precept and example serve to supplement and drive home the lessons brought out in classroom discussion. The danger of impulsive and uncontrolled action, whether in social, religious, or political matters, is emphasized on all occasions.

Every trade pupil devotes eight hours per day for six days of each week to his trade, including drawing, and two hours to academic work on five evenings of the week, from October 1 to June 1. During the summer months he has no academic work, but devotes nine hours per day to commercial work at his trade.

In order to give the pupils the best experience possible, as much commercial work is taken in each department as can be advantageously handled. As soon as a pupil is sufficiently skilled he is put on productive work under the direction of the instructor; for such work he receives compensation.

An additional school building was erected during the past year on which practically all of the bricklaying, tinsmithing, plastering, steam fitting, and painting was done by the pupils in those several

trades under the superintendence of instructors. All of the building operations on the grounds and the repair work on the 135 buildings give practical experience to all building trades pupils. What is true of the building trades is true in other departments, all of the trade work of the institution being done by pupil labor. In order to avoid any tendency to specialization, only a limited amount of commercial work of any one kind is taken.

An attempt is made to turn out not only a mechanic, but an all-around workman, who when thrown upon his own resources can meet an emergency. For example, the carpentry pupil is given supplementary instruction in the allied trades, as bricklaying, plastering, painting, tinsmithing, and wood turning, so that if called upon to do so, he can do all the work of repairing a house.

Twenty-four teachers of trade subjects were employed in 1909-10. Two of these were teachers of theory (mechanical and free-hand drawing). These men were pupils at trade schools and later were employed in trade work. The other 22 were teachers of practice trade work. Eight teachers had received some instruction beyond that of the public schools, and 17 were employed on account of their trade experience. All but 1 of the men teaching trade subjects had had from 1 to 8 years' experience in the trades.

The schools named in the following table comprise all the principal educational efforts to advance the negro in both academic and vocational opportunities:

Schools for negroes.

Name of schools.	Location.	Year of estab- lish- ment.	Class of school.	Day or evening school.
State Agricultural and Mechanical College.....	Normal, Ala.....	1875	Public.....	Day.
Snow Hill Normal and Industrial Institute.....	Snow Hill, Ala.....	1894	Philanthropic.....	Do.
Tuskegee Normal and Industrial Institute.....	Tuskegee, Ala..... ⁽¹⁾	do	Do. ²	Do.
Lincoln High School.....	Fort Smith, Ark.....	1902	Public.....	Do.
Armstrong Manual Training School: Day school.....	Washington, D. C.....	1901	do.....	Do.
Evening school.....	do.....	1902	do.....	Evening.
Alcorn Agricultural and Mechanical College.....	Alcorn, Miss.....	1878	do.....	Day.
Manual Training and Industrial School for Colored Youth.....	Bordentown, N. J.....	1894	do.....	Do.
Henrietta Trade School.....	New York, N. Y.....	1909	Philanthropic.....	Evening.
Industrial Evening School.....	do.....	1905	Public.....	Do.
High Point Normal and Industrial School.....	High Point, N. C.....	1891	Philanthropic.....	Day.
Berea Manual Training and Industrial School: Day school.....	Philadelphia, Pa.....	1899	do.....	Do.
Evening school.....	do.....	1899	do.....	Evening.
Avery College Training School.....	Pittsburgh (Alle- gheny), Pa.....	1849	do.....	Day.
Watchman Industrial School.....	Providence, R. I.....	1908	do.....	Evening.
Voorhees Industrial School.....	Denmark, S. C.....	1897	do.....	Day.
Mayesville Industrial and Educational Institute.....	Mayesville, S. C.....	1885	do.....	Do.
Claflin University.....	Orangeburg, S. C.....	1883	do.....	Do.
Hampton Normal and Agricultural Institute.....	Hampton, Va..... ³	1868	do.....	Day and evening.
St. Paul Normal and Industrial School.....	Lawrenceville, Va..... ⁴	1883	do.....	Do.

¹ Sewing, 1883; carpentry, 1884; other trades, 1886 to 1906.

² Also has evening academic classes.

³ Indians admitted in 1878.

⁴ Opened in 1884.

TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE, TUSKEGEE, ALA.

This school was established by an act of the Alabama Legislature in 1880 as the Tuskegee Normal School. Its first session was opened July 4, 1881, in a rented shanty, with 30 pupils and 1 teacher. In

1893 the institution was incorporated as the Tuskegee Normal and Industrial Institute.

The object of the school is to provide young colored men and women an opportunity to gain a sound moral, literary, and industrial training. It is expected that every Tuskegee graduate will become a factor in the moral and industrial uplift of his community.

The method of instruction employed aims to correlate and combine the academic studies and industrial training in such a way as to emphasize the social and moral significance of skilled labor and at the same time illustrate in the shop the practical meaning of the more abstract teaching of the classroom.

During the first session of the institute the present location, consisting at that time of 100 acres with three small buildings thereon, was purchased. Now the plant consists of 2,345 acres of land and 100 buildings. There also remain 20,176 acres of public land unsold from the 25,500 acres granted by act of Congress for the aid of the school. The endowment fund amounted to \$1,401,440.77 on May 31, 1910.

The affairs of the institution are administered by an executive council of 18 members, consisting of the principal, treasurer, and the heads of the several school departments. There is also an advisory board made up of business and professional men from all parts of the country. It is only with the industrial phase of the school that this report is concerned.

The industrial work is housed in the Slater-Armstrong Memorial Trades Building, which measures 283 by 315 feet in its greatest dimensions.

The subjects taught are determined by the executive council, bearing in mind the characteristics of the race with which they are dealing, the trades open to the Negro, and the needs of the race to develop the best that is in them.

Apprenticeships, as a rule, are not open to the Negro youth, so pupils must be prepared to do a journeyman's work upon graduation. The school aims to fit pupils for all trades which are open to Negroes. The trades taught and the number of pupils enrolled in the different trade courses on May 26, 1910, were: Baking, 15; basket making, broom making, and upholstering, 24; blacksmithing, 39; bricklaying, lathing, plastering, and tile setting, 102; brickmaking, 4; carpentry and wood turning, 97; dressmaking, 83; electrical work, 29; foundry work, 13; harness making and carriage trimming, 26; ladies' tailoring, 31; laundering, 7; laundering and soap making, 68; machine-shop work, 87; millinery, 42; painting (house and carriage), 25; plain sewing, 129; plumbing and steam fitting, 16; printing, 24; sawmilling, 7; shoemaking, 18; stationary engineering, 15; tailoring, 53; tinsmithing, 21; wheelwrighting, 23.

The courses cover one year in electrical work, ladies' tailoring, laundering, laundering and soap making, and sawmilling; two years in dressmaking, foundry work, millinery, machine-shop work, plain sewing, and stationary engineering; four years¹ in basket making, broom making, and upholstering; in the remaining trades the courses are three years in length.

Candidates for admission to Tuskegee must be not less than 14 years of age and must be able to pass the entrance examination, which

¹ Broom making 2, upholstering 2.

involves ability to read and write and to understand addition, subtraction, multiplication, and division. They must submit two letters of recommendation from persons of their own communities and must be of good moral character. They may enter the school at any time of the year.

The trade pupils attend academic classes from 9 a. m. to 12 m. and from 1 to 4.30 p. m. on three days of each week. Alternate days are spent at their trade, on which days they work from 7.15 a. m. to 12 m. and from 1 to 5 p. m.

Applicants are admitted to the trade courses of their choice as nearly as is possible. If, however, the quota of a chosen trade is full, the applicant is assigned to some other division until a vacancy occurs. In assigning pupils to their trades the mental ability to comprehend and the physical ability to perform the required duties are carefully considered.

The academic studies pursued by pupils in the various trade courses are mathematics, English, geography, and history. Mechanical drawing forms a part of the instruction in some trades and lectures on trade topics are included in the curriculum of all trades. The time devoted to academic work varies among the different subjects and trade courses followed. The aggregate hours per week given to theory and other schoolroom work by pupils in the several trade classes in 1909-10 were as follows: Baking, $10\frac{1}{2}$; basket making, broom making, and upholstering, 14; blacksmithing, 13; bricklaying, lathing, plastering, and tile setting, $17\frac{1}{4}$; brickmaking, $13\frac{1}{2}$; carpentry and wood turning, $14\frac{1}{2}$; dressmaking, 14; electrical work, $22\frac{1}{2}$; foundry work, $17\frac{1}{4}$; harness making and carriage trimming, 13; ladies' tailoring, 14; laundering, $15\frac{3}{4}$; laundering and soap making, 14; machine-shop work, $21\frac{1}{2}$; millinery, 14; plain sewing, 14; plumbing and steam fitting, $21\frac{1}{2}$; printing, $13\frac{1}{2}$; sawmilling, $15\frac{3}{4}$; shoemaking, $17\frac{1}{4}$; stationary engineering, $21\frac{1}{2}$; tailoring, 13; tinsmithing, $17\frac{1}{4}$; wheelwrighting, $17\frac{1}{4}$.

The total time devoted to both schoolroom instruction and practice work by the pupils in each trade course during 1909-10 was $45\frac{3}{4}$ hours per week. The school year embraces 36 weeks—from the second Tuesday in September to the fourth Thursday in May. A summer term covers 16 weeks, so that the school is open to pupils during the entire calendar year. The regulations governing the summer term are the same as those for the regular term.

The teachers at Tuskegee are all colored. Of 29 teachers of trade subjects falling within the investigation who were employed in 1909-10, 15 received training at Tuskegee and 4 at Hampton, while the others came from various colleges, mostly in the North. Actual trade experience in the subject taught, ranging from 2 to 20 years, was reported by 13 teachers, and previous experience in teaching the trade by 16 teachers. Only 2 of the teachers of trade theory had any practical experience. Eight had no trade experience, but a teaching experience covering from 1 to 8 years.

Pupils who complete the prescribed course of study in any trade are awarded a certificate. About 50 per cent of the pupils are reported to leave school at the end of the second year, due in large measure to their desire to enter gainful employment. Many of the buildings of the institution were built by student labor.

While this school makes a considerable commercial product, the pupils earn nothing from the sale of products, nor do they work for wages outside of school. A part of the school product is used by the institution and a part is offered for sale in the open market. In 1909-10 the value of products sold and work done amounted to \$2,725.

VOCATIONAL GUIDANCE.

Vocational guidance is the newest development in connection with industrial education, the term being practically unknown and the thing practically nonexistent five years ago. As connected with industrial education it is based on the fact that the great majority of children at the time when they leave school and go to work have really made no choice of a pursuit at all, but take the first position they can get, regardless of its fitness to them or theirs to it. Often the children have not and can not attain the information which would enable them to make a choice.

The history of vocational guidance is not very long, but it has made rapid strides. The movement began about five years ago in Boston. Its founder, the late Prof. Frank Parsons, director of the Civic Service House, organized a bureau in 1907 for the purpose of advising young men in their choice of a vocation. The present bureau represents a cooperative effort on the part of public-spirited men and women in the fields of labor, education, commerce, manufacture, and social work, in an attempt to organize and to put into operation a comprehensive plan of vocational advice and assistance for the children and young people of Boston. With all due respect to the activities in other parts of the United States, it is believed that this bureau presents the most comprehensive plan of action. The bureau does not prescribe vocations, nor is it conducted as an employment office; its chief service is in bringing together the best occupational information and in devising the best methods in applying such information in assisting the child and its parents in making an intelligent choice of a career. The bureau cooperates with the schools in outlining methods of helping pupils choose their life work and preparing for it. It is also conducting a training school for teachers and the school officials who have been appointed by the school board of Boston as vocational counsels.

The activities of the vocation bureau fall into four general groups:

1. The maintenance of an office, centrally located, for the collection and study of information concerning the various occupations of the community. When secured, this information is classified and made public in such a way as to help young people, teachers, and parents to understand what the occupations hold out, their advantages and disadvantages, and the conditions for efficiency and success in each.

2. To make clear the need of training and educational equipment for the desirable occupations, and by advice and cooperation to prolong the school period of young people, whether by day, evening, or part-time courses, and also to secure other educational opportunities when needed.

3. To organize personal vocational counseling both for those in school and for those already at work in order to enable them to plan intelligently for their educational and vocational progress.

4. To furnish opportunities for consultation to people of all ages, who have personal problems concerning the trades, the professions, and academic or industrial pursuits.

The late Prof. Frank Parsons, of Boston, noticing how many children were either out of work or unfitted for the work at which they were occupied, said: "Since they don't get into their 'life's work,' we will have to start a bureau to give advice about 'life work.'" In other parts of the country people met the same problem by saying: "These children are 'out of work; let's get them jobs.'" Up to the present time the movement has been divided into these two camps; that is, to get them jobs, or to give them advice about how to get jobs.

Miss Alice P. Barrows, director of the Vocational Guidance Bureau of New York City, commenting upon the dangers of vocational direction, has the following to say:

Probably the greatest danger of vocational guidance at the present time is that its supporters may endeavor to guide children into vocations.

"Vocations" and "Guidance" are dangerous words, both because they are vague and because they sound impressive. I have never been able to find a satisfactory definition of vocation, and it certainly does not seem to be a word descriptive of actual conditions. There are "jobs" and there are positions, but one of the problems of vocational guidance is to find out what a vocation is at the present time. "Guidance," on the other hand, has an ecclesiastical tang that is particularly dangerous to the cause of democratic education. It is most questionable whether, under any circumstances, anyone has the right to guide children systematically into vocations. Giving guidance is one thing, and giving information so that there will be greater freedom of choice is quite a different thing. At present we can not give even this information about vocations, because we do not know enough about actual conditions to give it. Yet it sometimes seems as though the whole tendency of vocational guidance at the present time were to give some information, any information, because the lack of it is felt so keenly—just as a layman in the presence of an ill person might snatch something, anything, from the doctor's black bag and give it to the patient, thereby possibly injuring him for life. The fact that he did it because he could not bear not to do something would hardly exonerate him in the eyes of the world. The fallacy of the point of view back of this attempt to meet the situation by immediate action may be found in tracing the history of the movement, and there, also, we may find the justification of the movement.

Given the difference in the rapidity of changes in industry and education and a sudden awakening on the part of industry to the fact that it needs better workers and on the part of education that it has not kept pace with social and industrial changes, and add to this a praiseworthy desire on the part of the schools to make up for lost time, and on the part of industry a realization that their demand for the training of workers is part of a new popular movement in which their judgment as "practical men" will carry weight, and we have the scene set for a more subtle and indefinable exploitation of children than the world has ever seen—subtle and indefinable because all would be done in the name of the "good of society and of the child"; exploitation because the employment of children of 14 is as much exploitation as the employment of children of 10. The chief difference seems to be that, in the case of 14-year-old children there is a likelihood of exploitation of their minds at the most important period of development; that is, when they are first beginning to use them consciously, and when they consciously long for training; while with children of 10 exploitation means the premature death of any ambition for training. I should say that to arouse the ambition and interest of a child of 14 by promising him "trade training" the value of which is dubious, and then a job where he "can work up," when we have no facts to prove that he can work up, and a distinctly uncomfortable feeling that he probably can not, is after all even worse than stunting a child by premature labor so that you can not arouse his ambition at all. It behooves us not to start vocation bureaus too soon, and thereby arouse hopes in the children who are now leaving school by promises of training or of jobs which we can not fulfill. It behooves us to make sure that our trade courses are worthy of the time and money of the children, and that the jobs are fit occupations, before we urge them to enter either.

VOCATION BULLETINS.

No more far-reaching piece of work has been done to provide an insight into and an intelligent interest in the trades than that accomplished by the Vocation Bureau of Boston. The research studies by the bureau on vocations, published in bulletin form, supplies those interested with a pen picture of the trades never before attempted.

Every avenue of information has been exhausted in order to give the prospective apprentice a view of the good points as well as the shortcomings of the trades, together with an insight into the prospective earning power commensurate with increasingly developed capacity.

The preparation of these bulletins and of all the other bureau activities is under the direction of Mr. Meyer Bloomfield. Already eight bulletins have been published, as follows: "Machinist," "Banking," "The Baker," "Confectionery Manufacture," "The Architect," "The Landscape Architect," "The Grocer," "Bookkeeping and Accounting," and one on "Department Stores." The purpose of issuing the bulletins is to supply information to parents and advisers of youth, and to boys and young men concerned over the choice of a vocation, but it is not intended that they should take the place of personal consultation and cooperation. The bulletins issued are most complete and analytical.

The following bulletin, reproduced in full, is an illustration of the work of the bureau and shows the minor details of the particular trade applicable to Boston boys:

THE MACHINIST.¹

The trade: Its divisions, dangers, conditions, and future.—The trade of the machinist consists in the manufacture, installing, and repair of machinery; or "A machinist is a constructor of machines and engines, or one versed in the principles of machines; in the general sense, one who invents or constructs mechanical devices of any kind."

The two grand divisions of the occupation are general machine work and tool making. The manufacturing branch of the industry, which is almost entirely shopwork, has the following specialized lines or divisions: The all-round machinist, only a very small per cent of those engaged in the occupation; the lathe hand; the planer hand; the milling-machine hand; the drill-press hand; the erecting and assembling shop hand; the tool, jig, and die hand, a division itself highly specialized; the automatic machine operator, who is hardly a machinist; and the outside erecting and assembling hand, who must have good judgment and often expert knowledge of the machine to be erected. Another division in the industry in some cases quite separate, in others not, is that of the machine repairer, who ranks with the erector and assembler. The pattern maker is a woodworker.

Most machinists engage in several of the divisions of the industry or pass readily from one to another. Employees of the Government generally remain fixed in one.

The four divisions of people connected with the occupation receiving wages or salary are the apprentice boy, the journeyman, the foreman, and the superintendent.

The chief danger of the occupation is from dust in cutting and grinding metals, especially in brass working. There is danger from machinery with hard labor and strain in handling heavy materials or working on heavy products. There is considerable monotony, also, in working on automatic machines. On the other hand, some shops manufacture such a variety of products, one shop visited manufacturing 3,800 different kinds of tools, that the workman's interest is steadily maintained.

There is keen competition in the general lines of the industry. Many machine shops manufacture special machines, tools, or articles, some of which are under patent control and are thereby less affected by competition. The field of the machinist has been enlarged in recent years by the growth of the automobile industry.

¹ Issued by the Vocation Bureau of Boston, printed by permission of the director, Mr. Meyer Bloomfield. Copyrighted 1911.

The high specialization of processes at the present time and constant improvements in the machinery used in the modern shops affect the number of employees, making it comparatively less in the individual shops in most cases year by year, while the entire industry enlarges.

There is an ever-widening field for the expert machinist, and the future of the industry will be good in all lines because of the constantly increasing demands of the industrial world.

Pay, positions, and opportunities.—Pay at the beginning ranges from \$3 to \$8 a week, according to age, conditions of apprenticeship, or shop entered, being more generally, outside of the apprenticeship system, from \$4 to \$6 a week. The average yearly increase for boys is small, being usually \$1 a week each year.

Boys do errands, act as messengers or as assistants to machinists, do drilling, milling, lathe work, planing, shaping, and run light machines. A young man, after a period of learning such processes, earns from \$12 to \$15 a week in most shops. In the general trade the wages paid are as follows: In lathe and planer work, erecting and assembling, and operating automatic machines, from \$1.50 to \$2.50 a day; in milling and drill-press work, \$1.25 to \$2 a day; in tool, jig, and die making, from \$2.50 to \$4.50 a day; in outdoor erecting and assembling, from \$2.50 to \$4.50, with traveling or personal expenses added in some cases; in the repair shop, \$2.50 to \$4; the journeyman who has finished his apprenticeship or period of learning earns \$2.50 to \$2.75 a day; a foreman earns from \$21 to \$25 a week. The salary of a superintendent depends mainly on the man, ranging from some hundreds of dollars a year in the small shop to many thousand in the great corporation. The average machinist in Boston earns about \$16 a week, in the State about \$600 a year, and the average workman in the trade in the United States about \$400 a year, taking into consideration the conditions of unemployment usually existing. Anyone earning less than \$2 is sometimes ranked as a helper; one getting over \$2.50, an expert.

In repair shops very few boys are employed, trained machinists being regularly drawn from other branches of the industry.

Firms which conduct an apprenticeship system do not generally desire boys on any other basis, and give to the few taken outside of the system only unimportant duties, as errand and messenger service, which afford little chance to learn and advance in the occupation.

Outside of the trade of the machinist, boys who have had some business training do office work in machine shops, as bookkeepers, accountants, and stock-ledger keepers, at about the same pay as such service brings in other industries.

Outside of any single easy process it takes at least three years to make a boy worth much to an employer in a machine shop. Advancement is slow to the age of 20 or 21.

Apprenticeship in the trade.—The modern apprenticeship system in the various trades in this country had its beginning in the years from 1860 to 1872, and from the latest statistics available 43 States have laws relating to the employment of apprentices. Thirty-eight States provide that in addition to the trade the apprentice shall be taught the common English branches of education in some public or other school or through such means as the employer may provide.

The older and larger machine shops in Boston and vicinity have some full or partial apprenticeship system, and the general conditions connected with it are as follows:

1. There is an indenture or agreement of apprenticeship.
2. The age preferred for entering is 16 or 17, and the age limits are 15 and 18.
3. The usual length of time required is four years, with a probationary period of two months.
4. The pay is generally 8 cents an hour the first year, 10 cents the second year, 12½ cents the third year, and 15 cents the fourth year.
5. There is a bonus of \$100 payable at the end of the period of apprenticeship. Against this bonus each apprentice may be charged for tools, technical books, drafting equipment, etc.
6. Time used in study counts as actual service in the shop.
7. Wages are paid weekly, for 54 hours in the winter and 55 in summer.

In the apprenticeship system of one large corporation, for machinists, work is given during the first six months on the bolt and milling machines and on small tools; on general bench work for the second six months, as shaping and filing; for the third six months boys work under the direction of various machinists on drills, planers, grinders, lathes, and boring mills; the fourth six months they are given more difficult work, on slotters, planers, and shapers. At the beginning of the third year the apprentice is placed at whatever tool he has shown himself to be most efficient with and is given work which will develop his special ability. After the first six months school work is required of the apprentice unless he shows that he is already proficient therein. During the period of probation apprentices are required to serve as messengers, in office duties, or in any miscellaneous service.

The system of another large corporation is here given in full, by permission:

Apprentice courses for machinists, die and tool makers, and pattern makers.—These courses are open to boys of at least 15 years of age who have had a grammar-school education or its equivalent and who are physically strong enough to undertake the prescribed work.

The courses last four years (including the trial period).

Apprentices are paid a compensation of—

Eight cents for each hour of actual service for the first half year.

Ten cents for each hour of actual service for the second half year.

Twelve cents for each hour of actual service for the second year.

Fourteen cents for each hour of actual service for the third year.

Sixteen and one-half cents for each hour of actual service for the fourth year.

The regular working hours are 55 per week, so that the weekly wages, even at the beginning, are sufficient for self-support.

The completion of the full term of apprenticeship entitles the graduated apprentice to a "certificate of apprenticeship" and a cash bonus of \$100.

The classroom instruction is based on a grammar-school education and includes arithmetic, algebra, geometry and plane trigonometry, physics as it concerns simple machines, power transmission, strength of materials, machine design, magnetism and electricity, mechanical drawing, and jig and fixture design. For pattern-maker apprentices an extended course in mechanical drawing is substituted for jig and fixture design and for part of the physics instruction.

While a small percentage of machinists have served an apprenticeship, this system helps make the all-round machinist and a fair proportion of the most skilled workmen in the various branches of the trade.

In the first corporation mentioned about 5 per cent of all employees at the present time are serving in some part of the apprenticeship system.

Union shops allow one apprentice for the shop and one for each five machinists.

The boy: Qualities and training required.—In this occupation a boy is rarely taken under 15 years of age. From 16 to 18 is the age very generally preferred. Only the larger firms have a regular apprenticeship system, since young men after learning the trade pass so readily from one shop to another or from one branch of the trade to another.

Boys should have a grammar-school education. In the occupation are found many high-school and technical-school graduates, these quite generally becoming foremen or superintendents. It is an advantage for young men in machine shops to continue their studies in mathematics and drawing in evening schools or classes.

A boy should have natural mechanical skill or adaptability to tool and hand work. He should be strong, energetic, and of good physique.

Three important factors in advancement in this trade are: First, mastery of the work in hand; second, the ability, the health, and the energy to get the related studies bearing on the trade, such as shop mathematics, shop English, shop drawing, and shop science and practice; third, the development of the qualities of leadership.

Comments of people in the trade.—It is a detriment to a boy to specialize. The constant repetition of a process dulls ambition and narrows interest and power. We will not hire the indifferent, street-corner boy. Some parts of the year it is very difficult to find any suitable ones. We want the best out of the schools, and offer them a good future.

The chief trouble with boys in this industry is their inclination to go from shop to shop while yet practically learners only.

The repair shop is a place for expert workmen only—masters of the machines which they have to repair.

Boys naturally want to earn more than is possible in learning a trade and it is not always easy to maintain an apprenticeship system in this country. The present high industrial organization calls for short cuts and time-saving methods. The machinist, however, should serve several years to become an expert workman.

The chances of a boy to learn are better in a small shop, where he can have the constant personal attention of an employer or foreman.

Machinists are quite generally satisfied with their vocation, coming into it after some deliberation and frequently through some system of apprenticeship.

The past in this occupation has been good, and the future has a fair outlook. There is a lack still of skilled machinists.

Comments from the Massachusetts Board of Health Report, Dangerous Occupations, 1907—Manufacture of machinery, machine parts, and metal supplies.—In the manufacture of machinery and metal supplies there are several operations which involve exposure to dust, fumes, vapors, or extreme heat. These include making castings, cleaning and smoothing, grinding and polishing, and scaling.

While the nature of some of the processes is such as to warrant classification of this industry with the dangerous trades, the conditions under which the work is done are very largely responsible for the injurious effects on the health of the employees, and these conditions are to a considerable extent avoidable or at least susceptible of improvement.

[From Massachusetts Census Report.]

A.—*Statistics of manufacture, 1908: Foundry and machine-shop products.*

	The State.	Boston.
Number of establishments.....	519	106
Capital devoted to production.....	\$60,525,711.00	\$11,152,410.00
Value of stock and materials used.....	\$20,791,813.00	\$2,976,147.00
Amount of wages paid during the year.....	\$18,699,125.00	\$2,200,481.00
Average yearly earnings.....	\$601.03	\$681.47
Value of product.....	\$56,208,811.00	\$7,171,175.00
Males employed.....	30,661	3,190
Females employed.....	451	39
Both sexes.....	31,112	3,229
Smallest number.....	25,874	2,576
Greatest number.....	37,863	4,045

B.—*Selected occupations, 1905: Age periods for machinists in employment.*

	Aggregate.			Machinists.			Ma-chin-ists' helpers.
	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.	
Under 16 years.....	110	-----	110	32	-----	32	78
16 to 24 years, inclusive.....	6,835	2	6,837	4,986	2	4,988	1,849
25 to 44 years, inclusive.....	15,810	1	15,811	15,278	1	15,279	532
45 to 64 years, inclusive.....	6,069	-----	6,069	5,882	-----	5,882	187
65 years and over, and unknown.....	782	-----	782	767	-----	767	15
Aggregate number.....	29,609	3	29,609	26,945	3	26,948	2,661

C.—*Manufactures, 1905: Machines and machinery.*

Number of establishments.....	709
Private firms.....	479
Corporations.....	222
Industrial combinations.....	8
Partners and stockholders.....	7,512
Amount of capital invested.....	\$75,797,145
Value of stock used.....	\$22,273,370
Value of goods made.....	\$59,621,469
Persons employed:	
Average number.....	33,182
Men 16 years and over.....	32,395
Women 16 years and over.....	539
Children under 16 years.....	248
Smallest number.....	27,736
Greatest number.....	38,984
Excess of greatest over smallest.....	11,248
Total amount paid in wages.....	\$19,271,846
Average yearly earnings.....	\$580.79
Number of salaried persons.....	2,836
Total amount paid in salaries.....	\$3,814,114
Average salaries.....	\$1,344.89
Average proportion of business done (per cent).....	61.96
Average number of days in operation.....	290.82

STATE COMMISSIONS ON INDUSTRIAL EDUCATION.

During the last decade nine States—Connecticut, Maine, Maryland, Massachusetts, Michigan, New Jersey, Wisconsin, Illinois, and Indiana—have appointed special commissions for the study of industrial education.

The duties of these commissions have usually been to investigate the needs for education for persons employed or aiming at employment in the different trades, as well as to report upon what extent existing institutions are responsible for such training.

A striking evidence of the growing popular interest in industrial education is the number of commissions appointed and the scope of their activities as well as their recommendations.

The results obtained from these investigations have been extremely important, inasmuch as legislation has resulted in the revolution of the educational systems of the several States.

It is also of special importance to note that in the States which have appointed commissions the municipalities have usually appointed commissions for an intense study of the subject, and usually the municipal commissions have acted in cooperation with the State commissions to considerable advantage.

It is also worthy of note that in addition to the studies being made by the aforesaid commission that foreign countries have sent commissions to this country to study the educational advantages which have been developed. The Moseley Educational Commission and the Royal Commission, appointed by the English Government in 1903, devoted particular attention to the schools offering preparation for the trades in this country. More recently the German Government has sent commissioners to study the development of industrial education, the results of which were published by the House of Deputies of the Prussian Parliament. In 1910 the Canadian Government appointed a commission to visit the United States and such foreign Governments as it deemed expedient to study the systems of trade education and report to Parliament.

APPENDIX A.

PRESIDENT GOMPERS'S REPORT.

In his report to the convention of the American Federation of Labor, held in Toronto, Canada, November, 1909, President Gompers said under the caption "Industrial education":

"The American labor movement is in line with, and has given expression to, the best thought for the education of all the people in all the elements of learning. It is especially interested in the further education of the wage-workers of America, industrially. At several conventions the American Federation of Labor has gone on record upon these subjects, and at Denver last year the following resolution was adopted:

"Resolved, That the President, in conjunction with the executive council of the American Federation of Labor, be, and is hereby, authorized to appoint a special committee of at least 15, to be composed of a majority of trade-union members of this convention, who will serve without compensation and incur no expenses other than necessary and legitimate expenditure within the judgment of the president and executive council, to investigate the methods and means of industrial education in this country and abroad, and to report its findings, conclusions, and recommendations to the next annual meeting of the American Federation of Labor."

"In accordance with this instruction the executive council with me endeavored to constitute a committee, but there was some difficulty in accomplishing that result by correspondence. Later, and during my absence from the country, the committee was completed, detailed report of which will be communicated to you in the report of the executive council.

"Two meetings of the committee on industrial education have been held; one in New York City during the summer, the other at Washington, D. C., last month. The latter I was privileged to attend. Prior to my departure the executive council directed that I make an effort to learn some of the present conditions of industrial education in European countries as well as the position which organized labor there takes toward the subject. With the important duties devolving upon me while abroad, there was little time to make a careful study of the systems in vogue, but the best that has been said and printed upon the subject has been gathered in printed form. Nowhere in all the countries that I visited has there been an expression of organized labor other than in full indorsement of the best methods to educate the workers industrially as well as along lines of the arts and sciences; and thus there is the universal declaration of the organized workers upon this great question.

"It may not be uninteresting here to call attention to the ignorant, reckless, and vindictive hostility which the Post-Van Cleve-Parry-Kirby National Association of Manufacturers has manifested toward the American labor movement. When our conventions declared in favor of industrial education, and particularly since the authorization at Denver for the creation of a special committee to pursue the study of the problem and to report, the most malignant misrepresentations of our purposes and aspersions upon our character were the utterances of these men who, judging us from their own narrow standpoint, charged us with perverting the purpose of industrial education. Our own work in this and other fields of activity, the results achieved and yet to be achieved, must and will stand as our best answer.

"The American labor movement appreciates the fact that experience has shown that education, industrially, is but one phase of the growing recognition of labor's rights, and that in this respect it is closely related to all the general work of the trade-union movement, the movement which has since its inception stood for constantly increasing better opportunities, better factory and labor conditions, better home life, and the protection of the young and innocent children from exploitation.

"Organized labor has always been and is now deeply concerned with the well-being of the human family and all the influences that go to make for the advancement of the industrial workers. In our principles and purposes are comprised the fullest scope of human activity. Labor has always manifested its humane interest in the welfare of children; it realizes that industrial education has the same purpose and aims—that is, to secure cooperation of all human agencies which make for the betterment of mankind.

"Industrial education, the raising of the age limit of child workers, and compulsory school attendance are necessarily a part of the one great beneficial scheme. Organized labor has always stood for, aye, has been the pioneer in, the demand for free schools, free textbooks, compulsory education in the elementary grades, and for the fullest and freest opportunity in all lines of learning, technology included.

"The subject of education, industrially, concerns not only the wage earners themselves, but every inhabitant of the nation. It is therefore necessary and eminently proper that it be administered by the same authority and agency which administers our public-school systems and such other institutions as are concerned in the public welfare.

"Already reference has been made to the false position in which some elements of employers would place our movement upon this subject. All we ask of fair-minded men is a comparison of the utterances of our opponents with our own. We contend that education in America must be free, democratic, conducted by, of, and for the people, and that it must never be consigned to, or permitted to remain in, the power of private interests where there is sure to be the danger of exploitation for private profit and willful rapacity. Under the pretense of industrial education private agencies for personal profit have perverted the term, resulting in a narrow and specialized training, to the detriment of the pupils, the workers, and people generally.

"Modern methods of manufacturing, with their division and subdivision and specialization, have, to a large extent, rendered nearly superfluous and therefore largely eliminated the all-around skilled worker. Some so-called modern apprenticeship systems are narrow, producing a line of trained 'specialists.' It has been well said that specialists in industry are vastly different from specialists in the professions. In the professions specialists develop from the knowledge of all the elements of the science of the profession. Specialists in industry are those who know but one part of a trade and absolutely nothing of any other part of it. In the professions

specialists are possessed of all the learning in their professions; in industry the specialists are bereft and denied the opportunity of learning the commonest elementary rudiments of industry other than the same infinitesimal part performed by them perhaps thousands of times over each day.

"Our movement in advocating industrial education protests most emphatically against the elimination from our public-school system of any line of learning now taught. Education, technically or industrially, must be supplementary to and in connection with our modern school system. That for which our movement stands will tend to make better workers of our future citizens, better citizens of our future workers."

APPENDIX B.

EXECUTIVE COUNCIL'S REPORT.

During the second day of the Toronto convention the executive council, in its report, made reference to industrial education and its action in relation to the resolution adopted by the Denver convention, and reported as follows:

In accordance with the resolution adopted by the Denver convention, which comprehended the appointment of a special committee on industrial education, we beg to submit the following report:

A special committee on industrial education was appointed to consider the subject matter therein contained. The resolution creating the special commission reads as follows:

"That the president, in conjunction with the executive council of the American Federation of Labor, be, and is hereby, authorized to appoint a special committee of at least 15, to be composed of a majority of trade-union members of this convention, who will serve without compensation and incur no expenses other than necessary and legitimate expenditure within the judgment of the president and executive council, to investigate the methods and means of industrial education in this country and abroad, and to report its findings, conclusions, and recommendations to the next annual meeting of the American Federation of Labor."

In accordance with its provisions there were appointed as members of the committee the following:

John Mitchell, chairman; headquarters, Civic Federation, 10096 Metropolitan Building, New York City.

John Golden, president Textile Workers, box 742, Fall River, Mass.

James Wilson, president Pattern Makers' League, 403 Neave Building, Cincinnati, Ohio.

Miss Agnes Nestor, secretary Glove Workers' International Union, room 506, Bush Temple of Music, Chicago, Ill.

Mrs. Raymond Robins, National Woman's Trade Union League, 372 West Ohio Street, Chicago, Ill.

John B. Lennon, Bloomington, Ill.

Charles P. Neill, Commissioner Bureau of Labor, Washington, D. C.

W. B. Wilson, Congressman, House of Representatives, Washington, D. C.

Frank Duffy, Brotherhood of Carpenters, box 187, Indianapolis, Ind.

Hugh Frayne, Sheet Metal Workers, 1711 Summit Avenue, Scranton, Pa.

James O'Connell, machinist, executive board, care Room 405, McGill Building, Washington, D. C.

Charles H. Winslow, Massachusetts commissioner of industrial education, Arlington, Mass.

Edward Hirsch, editor, North and Baltimore Streets, Baltimore, Md.

James Roach, iron molder, Albany, N. Y.

Rev. Charles Stelzle, Department Church and Labor, room 700, 156 Fifth Avenue, New York City.

Stuart Reid, general organizer American Federation of Labor, Lynn, Mass.

By unanimous request at its first meeting:

Samuel Gompers, president of the American Federation of Labor, Washington, D. C.;

James Duncan, first vice president of the American Federation of Labor, Quincy, Mass.; and

Frank Morrison, secretary of the American Federation of Labor, Washington, D. C., were elected to serve as members of the committee.

The initial meeting of the committee was held in New York on August 21 and continued during the following day. The two days' sessions served for the purpose of

considering and deciding upon the policy to be pursued. At these meetings information was received by the various members, from its chairman, and others, who were requested to appear before them, and with the information imparted, together with an exchange of views, considerable progress was made.

The second meeting was held in Washington, D. C., October 22-23. The committee early realized the necessity of going directly to those for information who had made a study of the subject, and with this point in view extended invitations to some of the foremost educators, business men, and publicists, as well as others, to appear before them, and as a result much valuable information was placed at the disposal of the committee. The following is a list of the persons invited to appear before the committee:

W. B. Prescott, International Typographical Union, Commission on Supplemental Trade Education.

Charles R. Richards, originator of the National Society for the Promotion of Industrial Education.

Leslie W. Miller, principal Pennsylvania Museum and School of Arts.

Dr. Herman Schneider, dean of the University of Cincinnati.

John M. Shrigley, president Williamson Free School for Mechanical Trades.

A. Lincoln Filene, of William Filene's Sons Co., Boston, Mass.

Paul H. Hanus, professor of education, Harvard University.

Frederick P. Fish, president Massachusetts State Board of Education.

Dr. Andrew S. Draper, commissioner of education of the State of New York.

Arthur D. Dean, chief division of trade schools, New York education department.

C. W. Cross, superintendent of apprentices, New York Central lines.

Miss Ella M. Haas, district inspector, department of inspection of workshops and factories of the State of Ohio.

Charles R. Towson, secretary industrial department, the International Committee of Young Men's Christian Association.

J. C. Monaghan, secretary National Society for the Promotion of Industrial Education.

Frank A. Vanderlip, president National City Bank, of New York.

Dr. Alexander C. Humphreys, president Stevens Institute of Technology.

Mr. V. Everitt Macy, of New York.

Dr. Henry S. Pritchett, president of the Carnegie Foundation.

Dr. Elmer E. Brown, Chief Bureau of Education, Department of the Interior.

Mr. C. W. Burkett, editor American Agriculturist.

T. J. Foster, International Correspondence School, Scranton, or representative.

Raymond Robins, Chicago.

The net results of this meeting clearly indicated that our committee was pursuing a practical policy in its investigations, and that much valuable data and information were obtained. That there was much confusion in the public mind concerning industrial education was manifest. The committee conceived it imperative that honest differences of opinion be considered and pointed out and that an effort be made to help solve this great problem.

Organized labor favors that plan of industrial training that will give our boys and girls such a training as will help them to advance after they are in the industry.

Organized labor believes that there are pressing educational needs which can be at least partially solved by the introduction of industrial training; it is aware that boys and girls do not always have the opportunity to enter the field of employment which will best contribute to their development either physically, morally, or intellectually. Those who leave school change from one unskilled occupation to another and gain but little or nothing in efficiency. Labor believes that industrial education between the ages of 14 and 16 years ought to awaken in these children a new school interest, and so help retain them in school longer and contribute more to their development; it believes that if such industrial training took the children between the ages of 14 and 16, when they are of little value in a business way, at a time when the education they have received is of advantage so far as it goes, but hardly fits them for actual working places, it would serve to give them the proper training to prepare and enter some branch of actual vocational work.

We believe that as much attention should be given to the proper education of those who are at work in our industries as is now given to those who prepare to enter professional and managerial careers, simply to balance justice and make it necessary to give to the wage-earning classes and the common industries such equivalent as we can for what the present schools are doing for the wealthier classes, as well as for the professional and managing vocations.

The personal observations and first-hand information obtained here and in European countries which embrace the general plan of industrial education in the various

countries; details of schools at present in operation, both as regards the courses of study and the administration and financing; the views of some of the foremost authorities in industrial education; and the attitude of both employer and organized labor toward the instruction provided by numerous schools operated by means of State, local, and municipal subsidies and by private funds have all been collated.

That the impressions made by our individual and joint study were profound is not saying too much and the magnitude of the problem did not lessen. In considering the subject of the present status of industrial education it seems necessary to emphasize the need of a thorough and intense study of the future effect on American industries and the efficiency of the American workers and the full realization of their prosperity, and it is deemed expedient that this question be given the broadest and fullest consideration and discussion by this convention.

The report of the special committee on industrial education will be submitted to you in printed form. As that report itself shows, it is not sufficiently exhaustive, thorough, and comprehensive to warrant final action, yet it is confidently believed that it is an accurate statement of fact and the best that could be ascertained and presented within so brief a time as the committee had at its disposal.

We recommend that the committee be continued for at least another year; that they cooperate with the executive council and all other bodies having for their purpose extending public industrial education.

APPENDIX C.

The special committee appointed by authority of the Denver convention of the American Federation of Labor to consider, investigate, and inquire into the question of industrial education at home and abroad and report in detail to the Toronto convention of the American Federation of Labor in 1909, together with whatever recommendations, suggestions, instructions, and requests it considered necessary in order to place this all-important and vital matter clearly, broadly, and intelligently before the wageworkers of the country and the public in general, begs leave to report that the committee held three meetings during the year, as follows:

The first in New York City, August 20 and 21; the second in Washington, D. C., October 22 and 23; and the third in Toronto, Canada, November 9. Much information and data bearing on the subject matter of industrial education in all its phases was received and very thoroughly discussed, debated, and considered. The committee found the question of education, whether cultural, industrial, academic, or otherwise, so intensely interesting and vitally important that we have arrived at the conclusion that to report in full to this convention would not be advisable, owing to the fact that our investigations have not been completed and that we are yet awaiting information asked for from some of the most prominent business men of America, as well as from educators and others whom the committee thought might be able to give valuable data gathered from actual experience.

REQUIREMENTS OF THE RESOLUTION.

From the terms of the resolution under which the committee was constituted, it is evident that what was desired was:

First. A thorough investigation of the needs of industrial education;
Second. A statement of the extent to which needs are met by existing institutions, and

Third. As a result of such investigations, some definite suggestions for the promotion of industrial education in such manner as might best serve the interests of the whole people.

The committee has entered on its duties without fixed notions as to the form which industrial education should take throughout the country, and its investigations so far have made a profound impression upon its members.

DEMAND FOR INDUSTRIAL EDUCATION.

The importance of our subject can not be too highly estimated. The general demand for industrial knowledge and skill and the almost universal interest in the subject manifested by business organizations, boards of trade, labor organizations, as well as by educators and public men, is sufficient proof that the right kind of education for a boy or girl who expects to enter upon a vocational career is second only in importance to their having an education at all.

We must never lose sight of the fact that a large majority of the working people are poor, and because of this they are forced to begin the battle of life at an early age. The need of the day is that something be done for the children of this great wage-working class.

Formerly the apprenticeship system offered the boy an opportunity to learn a trade and become a thoroughly trained mechanic, but of late years the scheme of specialization has supplanted the old apprenticeship system, even to extreme specialization. It ought to be recognized as a scientific truth that the higher the skill possessed by the mechanic the more valuable is his labor, both to himself, his employer, and the community. The more efficient labor becomes, the higher wages it should command.

The one trouble in America to-day is that too many of our youths who have graduated from the grammar or high school are misfits industrially. If we are to secure industrial supremacy, or even maintain our present standards in the industrial world, we must in some way in our educational system acquire an equivalent to our old apprenticeship system.

APPRENTICESHIP SYSTEM.

It is of more than passing interest to note that a revival of apprenticeships by large corporate interests through comprehensive and sane regulations are gradually taking form.

With the growing feeling that the old-time apprenticeship system must be modified to meet modern conditions of life there looms up the question of a substitute which shall keep the best and most necessary of the older customs and meet modern requirements.

It is generally conceded by those interested in industrial education that the industrial school, *per se*, does not and can not result in turning out a full-fledged, skilled mechanic ready to take up his trade.

It is further recognized that the old apprenticeship system possessed many features that were uneconomic and unjust, but with the preservation of much that was good and its application by proper blending with the modern idea of perfection in theory, it would lead to more satisfactory results.

A marked tendency toward apprenticeships is taking place, and the feeling expressed by both employer and employed is that a gradual return will take place if such training is conducted sanely and advantageously to the American youth.

In order to bring out practical suggestions toward a solution of the problem the committee addressed themselves to the following questions:

1. Should trade, vocational, technical, and industrial schools be established as a part of the public-school system?
2. Should private industrial educational institutions be tolerated?
3. Under what conditions and terms should industrial schools, either public or private, be countenanced and supported?
4. Under what conditions should semiprivate or semipublic industrial schools, namely, the so-called "cooperative industrial schools," be approved or disapproved?
5. Should they be free, supported by the city, county, or State in which they are located?
6. Should they be under the control or partial control of the National Government?
7. And should their instructors or teachers be practical men from the ranks of trade occupations, or should they be men who know nothing of the trade itself except its theoretical side?
8. What should be taught under the head of "Industrial education"?—the cultural side, the professional side, the mechanical side, the business side, or all combined?
9. To what extent, if any, should labor headquarters, labor temples, and labor halls be used to favor industrial education?

Believing that progress could best be promoted by a close study of the prevailing systems now in vogue, and that some way should be provided so that the maximum of information should be obtained at the minimum cost of time and expense, the committee decided that invitations should be extended to a group of the foremost exponents of industrial education to meet with them in Washington October 23 and 24 for the purpose of conferring and explaining the merits of the several types of industrial education, and accordingly the following persons were extended invitations:

W. B. Prescott, International Typographical Union, commission on supplemental education.

Charles R. Richards, originator of the National Society for the Promotion of Industrial Education.

Leslie W. Miller, principal Pennsylvania Museum and School of Arts.

Dr. Herman Schneider, dean of the University of Cincinnati.

John M. Shrigley, president Williamson Free School for Mechanical Trades.

A. Lincoln Filene, of William Filene's Sons Co., Boston.

Paul H. Hanus, professor of education, Harvard University.

Frederick P. Fish, chairman Massachusetts State board of education.

Dr. Andrew S. Draper, commissioner of education of the State of New York.

Arthur D. Dean, chief division of trade schools, New York educational department.

C. W. Cross, superintendent of apprentices, New York Central Lines.

Miss Ella M. Haas, district inspector, department of inspection of workshops and factories of the State of Ohio.

Charles R. Towson, secretary industrial department of the International Committee of Young Men's Christian Associations.

J. C. Monaghan, secretary National Society for the Promotion of Industrial Education.

Frank A. Vanderlip, president National City Bank, of New York.

Dr. Alexander C. Humphreys, president Stevens Institute of Technology.

Mr. V. Everitt Macy, of New York.

Dr. Henry S. Pritchett, president of the Carnegie Foundation.

Dr. Elmer E. Brown, Chief Bureau of Education, Department of the Interior.

Mr. C. W. Burkett, editor American Agriculturist.

Mr. T. J. Foster, International Correspondence School, Scranton, or representative.

Mr. Raymond Robins, Chicago, Ill.

Naturally the result of this meeting, which occupied the greater portion of two days, with one evening session, was illuminating and instructive, and served to show the keen interest and alertness of labor representatives.

The object of the several systems of education was kept steadily in view throughout the entire conference, and the description of the leading types, showing their aims, objects, and methods of instruction, made a profound impression upon the members of the committee.

There was a remarkable unanimity of opinion on important points in regard to industrial education and the numerous demands for technical training for those who have completed a compulsory school attendance period and who desire to take up an industrial vocation at a later time.

It also served to show that the much-heralded apathy and disinterestedness charged by our critics to the trades-unions is more imaginary than real, and that organized labor was fairly abreast of the situation.

To the ladies and gentlemen who, at the sacrifice of valuable time from their business, cooperated with the committee in its investigations, the committee feels deeply grateful and appreciates the gratuitous services rendered in the abundant information and assistance given, and sympathizes with the universal thought expressed that the conference marked another epoch in the history of the trades-union movement for industrial education.

Subsequent discussion seemed to indicate that the champions of one system as against another might learn much from the different viewpoints, and that there was common ground for all on which to base the future development of a sound system of industrial education, free from the dangers which trades-union representatives pointed out.

PUBLIC V. PRIVATE CONTROL OF PUBLIC INSTRUCTION.

The committee feels that there is justification in condemning any system of public instruction privately controlled, or any scheme of private selection of pupils, and calls attention to the introduction of a plan which is being put into operation in several localities and fostered by manufacturers' associations.

"THE COOPERATIVE INDUSTRIAL EDUCATION PLAN."

It is a limited plan for industrial education, carried on between the high school, which engages a teacher for the purpose, one satisfactory to the manufacturers, and a group of the latter who indenture such boys as they desire to have. The idea is, of course, to give a thorough training. But,

(a) The manufacturer is not obliged to take any boys, or to keep any boy.

On the other hand, the high school is obliged to educate all duly qualified boys, to give them all that the city provides.

Therefore those who study in the cooperative course do so on sufferance.

(b) The people have no hand in this plan. No matter how much a father may desire such training for the boy, the city is helpless to do anything, as under this plan the veto power over the boy's right to public industrial education is in the hands of the manufacturer.

(c) The public school must be neutral as to trade-unionism. Surely it dare not be hostile. But what is there to restrain one or all the cooperative plants from assuming

any attitude, however hostile? They have the right to teach and to foster antiunionism with school-apprenticed boys under them.

(d) A boy who should talk over or agitate for union principles can be instantly deprived of his educational future under this plan; and if his father should be a known union champion only the good nature of the manufacturer can prevent reprisal in the form of dropping the boy from this course.

(e) The teacher can not help siding with the manufacturers; he can not protest, should he so wish, if they import scabs, strike breakers, or any sworn foes of unions. It is not for the school to say who shall be the fellow workmen of those young student apprentices. If he be a man of principles, he could not take the boys out of such a shop, for they are under bond.

(f) Finally, with a teacher too soft on the side of the manufacturers, we shall see, for the first time in a public school system, a spirit new in evil power—a class of school-boys trained under a thoroughly un-American system of private selection of pupils, based on no public or competitive method, unless the manufacturers so permit.

A system wholly removed from the salutary supervision of the people.

A system which needs no check in prejudicing the favorites of this system against the large excluded class of their school fellows, and later, against their fellow workmen themselves.

Any scheme of education which depends for its carrying out on a private group, subject to no public control, leaves unsolved the fundamental democratic problem of giving the boys of the country an equal opportunity and the citizens the power to criticize and reform their educational machinery.

The trend toward the introduction of schemes of industrial education and apprenticeships at public, as well as private expense, which pretends to teach trades in periods ranging from four months to four years, and turn out graduates in times of industrial peace who are able to earn only 50 per cent of the established wage in a given trade, and in times of industrial dispute are exploited in the interests of unfair employers, is worthy only of condemnation.

LEGISLATION.

Results vast in importance and magnitude have come from the action of Congress, in 1862, in giving land grants to each State, to be used for a State college of agriculture and mechanic arts. This appropriation of lands, followed by direct appropriation of money in 1890 and 1907, provides these colleges with a fund averaging about \$65,000 per State, or a total of over \$3,000,000 annually. While this fund was for a long time used largely for general studies, the subjects of mechanical arts, agriculture and home economics were finally developed, so that they now compete on nearly equal terms with the literary and scientific courses. Since most of this fund is in demand to train engineers, technical agriculturists and teachers in the mechanical, agricultural, and home economics subjects, comparatively little is available to give school training to those who wish to become expert workmen, farmers or home makers.

The title of the land grant act of 1862 provided for "colleges for the benefit of agriculture and the mechanic arts." Each State was required to "inviolably" appropriate the accruing interest and earnings from this gift to the "endowment, support, and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical subjects, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such sequence as the legislatures of States may respectively prescribe, in order to promote the liberal and practical education of industrial classes in the several pursuits and professions of life."

Though the law was plainly designed for the betterment of that 90 per cent who are in vocations where the labor is done with the hands, these schools, as most other schools, too often were conducted mainly to assist those who were seeking an avenue out of the manual side of the mechanical trades, agriculture, and home-making into the so-called professions. The research departments connected with these colleges and with other scientific and engineering schools and departments have now accumulated a vast body of knowledge useful to the workman. Much of this information has been arranged in textbooks and in courses for practical work in the school shops, in the commercial shops, on the farms, or in the home.

Gratified with the developments of the State colleges of agriculture and mechanic arts, Congress has been ever ready to meet requests to further build up these institutions. And there is a movement, with a large following in Congress, to still further develop the education to which these colleges were dedicated. Since only one college in a State can do little more for our greatly enlarged population than to provide courses of study for those who are to become technicians, and can not give equal opportunity in liberal and practical education to all of the industrial classes, this

new movement has crystallized around a plan for including the secondary public schools along with the State colleges of agriculture and mechanic arts, thus creating and giving direction to a complete national scheme of education, in which labor shall receive recognition and its just share of attention.

ORGANIZED LABOR'S POSITION.

Organized labor's position regarding the injustices of narrow and prescribed training in selected trades, by both private and public instruction, and the flooding of the labor market with half-trained mechanics for the purposes of exploitation, is perfectly tenable, and the well-founded belief in the viciousness of such practices, and consequent condemnation, is well-nigh unassailable.

Organized labor's record for years in regard to better sanitary conditions in factories and workshops, and its continued efforts toward safeguarding women and minors, have been the subject of wide discussion and much helpful legislation.

Its advocacy of free schools, free text books, and the raising of compulsory school age have been religiously adhered to, and closely allied to these subjects is that of industrial education, and any serious discussion of the proper kind of vocational training promotes discussion of the former.

There is a strong reaction coming in general methods of education, and that growing feeling, which is gaining rapidly in strength, that the human element must be recognized, and can not be so disregarded as to make the future workers mere automatic machines.

Experience has shown that manual-training school-teachers without actual trade experience do not and can not successfully solve this great problem, and that progress will necessarily be slow, as new teachers must be provided, a new set of textbooks will have to be written, and the subjects taught in a sympathetic and systematic manner.

In the last analysis, it is of greater moment to those engaged in industry whether this question should be discussed freely and fairly than it is to mere theorists, who advocate industrial education without having any definite plan or purpose (other than a selfish one), in their advocacy of the same, and it is believed that a unification rather than a multiplication of effort is needed in order to help solve this immense problem.

CONCLUSIONS.

It is believed that the future welfare of America largely depends on the industrial training of our workers and in protecting them.

The inquiries of the committee seem to indicate that if the American workman is to maintain the high standard of efficiency, the boys and girls of the country must have an opportunity to acquire educated hands and brains, such as may enable them to earn a living in a self-selected vocation and acquire an intelligent understanding of the duties of good citizenship.

No better investment can be made by taxpayers than to give every youth an opportunity to secure such an education. Such an opportunity is not now within the reach of the great majority of the children of the wageworkers. The present system is inadequate and unsatisfactory. Only a small fraction of the children who enter the lower grades continue through the grades until they complete the high-school course. The reasons which seem to be the prime causes for withdrawal are, first, a lack of interest on the part of the pupils, and, secondly, on the part of the parents and a dissatisfaction that the schools do not offer instruction of a more practical character. The pupils become tired of the work they have in hand and see nothing more inviting in the grades ahead. They are conscious of powers, passions, and tastes which the school does not recognize. They long to grasp things with their own hands and test the strength of materials and the magnitude of forces.

Owing to past methods and influences, false views and absurd notions possess the minds of too many of our youths, which cause them to shun work at the trades and to seek the office or store as much more genteel and fitting. This silly notion has been shaken by the healthy influence of unions, and will be entirely eradicated if industrial training becomes a part of our school system, and in consequence of this system of training he will advance greatly in general intelligence, as well as in technical skill, and in mental and moral worth he will be a better citizen and a better man and will be more valuable to society and to the country.

RECOMMENDATIONS.

Supplemental technical education.—The importance of this kind of school for those who have already entered the trades has been a matter for serious consideration by the committee.

The demand for such instruction is measured by the necessity for training in particular trades and industries, and the chief aim of such instruction should be to present those principles of arts and sciences which bear upon the trades and industries, either directly or indirectly.

The economic need and value of technical training is not to be disregarded, and cognizance should be taken of the fact that throughout the civilized world evening and part-time day technical schools enroll 20 pupils to every 1 who attends the other types of vocational schools.

The committee submits for consideration and discussion to the convention the proposition that there be established, at public expense, technical schools for the purpose of giving supplemental education to those who have entered the trades as apprentices.

We further recommend—

1. The continuance of progressive development of supplemental trade education as inaugurated by trade unions, and call special attention to the work undertaken by the International Typographical Union in the establishment of a school for the higher education of its members.

It is a practical application to a trade union of a necessity that exists and is admitted.

It is administered by printer-tutors who have never been afflicted with pedagogical cramp, and never expect to be; is within the reach of every man within the industry, and has succeeded in developing the latent talents and of widening the sphere of usefulness among its students, and ought to appeal to every ambitious printer.

A significant fact in connection with this school is that educators, as well as others of wide experience, believe that, for the adaptation to an end, this school has no equal. It also marks a new era in education, and one of its chief assets, other than the education of its students, is that public and private interests are emulating its example.

While other trade unions are engaged in activities of a like nature, though expressed in various forms, for the sake of brevity elaborate descriptions are omitted.

It is worthy of mention, however, that large sums of money are annually expended by trade unions for education, through the channels of official journals, and in some instances its members are being trained for the teaching profession, while the preparation of textbooks is another undertaking to be commended.

The committee further recommends that all trade unions which have not adopted a system of technical education give the matter the consideration it so richly deserves; and we further believe that the present undertakings of the unions call for the most enthusiastic admiration, and are entitled to the most cordial and loyal support.

Following is a list of organizations which have undertaken an extension of education for their members:

International Typographical Union, Electrotypes and Stereotypers, International Photo-Engravers of North America, Printing Pressmen and Assistants' Union, International Granite Cutters, International Horseshoers' Union, Pattern Makers' League of North America, and the Carpenters of Chicago and Cook County.

Technical industrial education—

2. We favor the establishment of schools in connection with the public-school system, at which pupils between the ages of 14 and 16 may be taught the principles of the trades, not necessarily in separate buildings, but in separate schools adapted to this particular education, and by competent and trained teachers.

The course of instruction in such a school should be English, mathematics, physics, chemistry, elementary mechanics, and drawing. The shop instruction for particular trades, and for each trade represented, the drawing, mathematics, mechanics, physical and biological science applicable to the trade, the history of that trade, and a sound system of economics, including and emphasizing the philosophy of collective bargaining. This will serve to prepare the pupil for more advanced subjects, and in addition to disclose his capacity for a specific vocation.

In order to keep such schools in close touch with the trades there should be local advisory boards, including representatives of the industries, employers, and organized labor.

3. The committee recommends that any technical education of the workers in trade and industry being a public necessity, it should not be a private but a public function, conducted by the public, and the expense involved at public cost.

4. We recommend the continuance of the life of the committee and final report to the 1910 convention.

5. That the convention requests the United States Department of Commerce and Labor to investigate the entire subject of industrial education in this country and abroad.

6. To request the committee to cooperate with the Department of Commerce and Labor in said investigation.

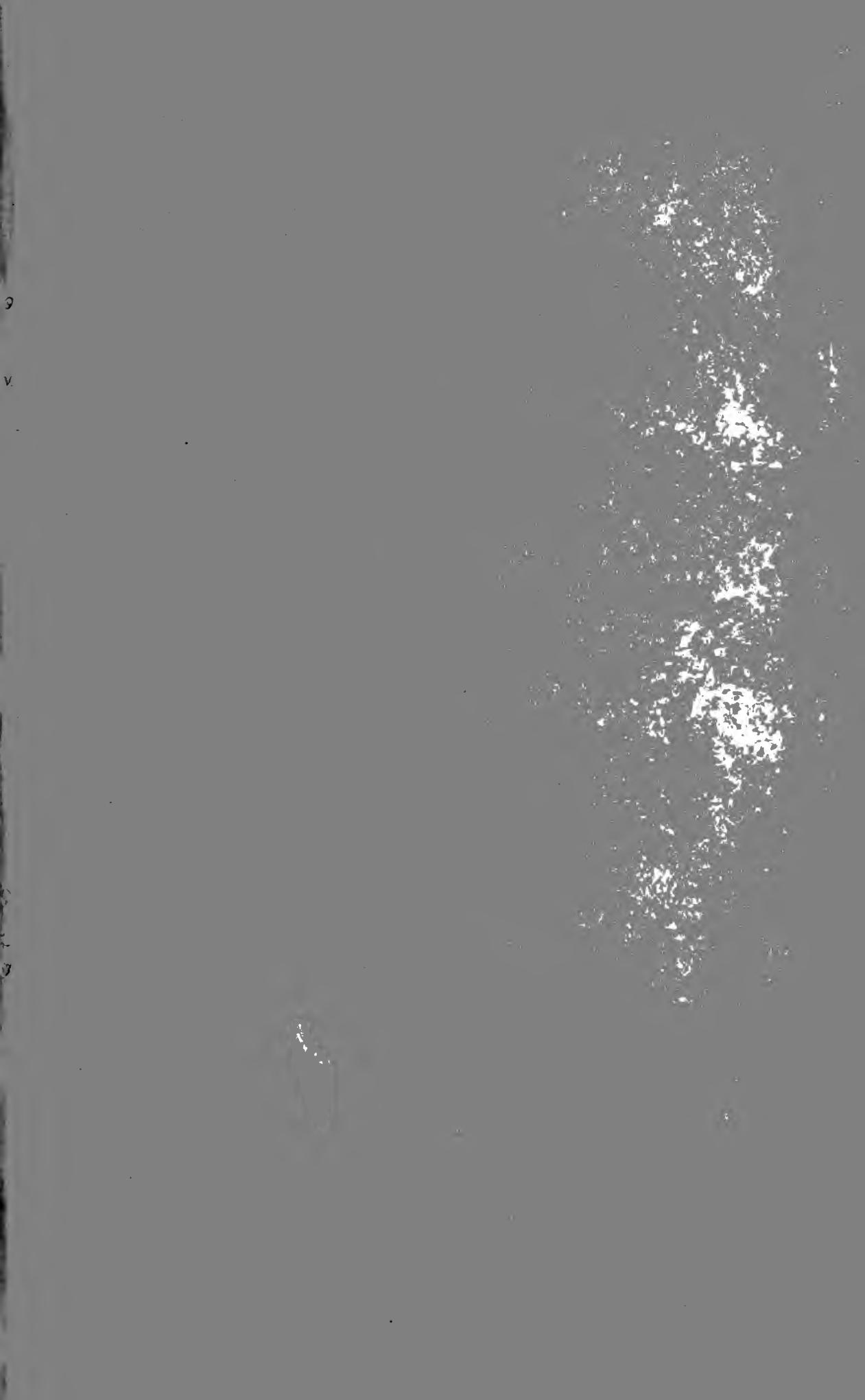
7. To request the executive council of the American Federation of Labor to act with said committee ex officio.

8. To request the officers of all organizations affiliated with the American Federation of Labor to supply us with all information they may have relative to industrial education as soon as possible, for the purpose of getting an up-to-date report with up-to-date methods of how industrial education should be taught, conducted, and promoted.

Appended to this report is a brief prepared for the use of the committee, which purposes to show, with reasonable brevity, just what is being done, and what has been begun in the recent past in regard to industrial education, including the problem; what has been done in foreign countries, methods of accomplishment in this country, showing systems and types of systems; that which is being accomplished by philanthropy and private interests; also that which is being done by the Federal Government, together with the State laws on the subject, and the attitude of employers and organized labor.

JOHN MITCHELL, *Chairman.*
SAMUEL GOMPERS.
JAMES DUNCAN.
JOHN B. LENNON.
DR. CHARLES P. NEILL.
EDWARD HIRSCH.
FRANK MORRISON.
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